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The Practical Teacher

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To the PRACTICAL TEACHER, October, 1894.

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N.B.—The SCIENCE SUPPLEMENT cannot be had through the Trade. It will only be supplied to Subscribers to the PRACTICAL TEACHER direct from the Publishing Office at above pre-paid rates.

TO OUR READERS.

FOR two or three years the Editor of this journal has felt that a definite section of it should be devoted to science each month. Since the passing of the Technical Instruction Acts, the number of students of science has largely increased, and there is every reason to believe that further progress will be made in the same direction. These developments indicate that, to keep pace with the times, the PRACTICAL TEACHER must concern itself with the interests of teachers and students of science. From time to time the Editor has received letters urging the advisability of extending the journal so as to make a portion of it appeal particularly to this *clientèle*. He has not, however, felt justified in taking this step until recently. But as soon as it had been decided to introduce the new feature into these columns, the services of a well-known and competent writer, thoroughly conversant with the workings and diverse subjects of the Science and Art Department, were obtained to conduct it. Under his editorship there can be no doubt that the section will increase the usefulness and interest of the PRACTICAL TEACHER. It will be his aim to make the section indispensable to everyone working for the May Examinations in Science. The wants of all such students will be met in every practical way. Model answers will be given to questions set in all the important subjects of the Department of Science and Art, and, as these will chiefly be written by assistant examiners, they will contain exactly the knowledge required to obtain full marks. It sometimes happens that what a teacher considers an adequate answer to a question would really only gain about half marks.

Periodical Examination Papers will be set. Students may have their answers corrected at a nominal fee.

Another feature of the new departure will be answers to queries. The Editor of the section is in touch with workers of the first rank in every branch of science, and is, therefore, able to obtain the best solutions to problems of any kind, or to give information upon any point coming within the scope of the section. Subscribers requiring explanations of difficulties, or advice upon courses of study, should communicate with the Editor, and accompany their query with a coupon cut from the current number of the PRACTICAL TEACHER.

Teachers of science, and students working up for Honours, find the greatest difficulty in keeping themselves *au courant* with recent developments of their various subjects. What they particularly want are brief and simple accounts of the most important researches upon which questions are likely to be set, and references to the sources where fuller descriptions can be obtained. This want has been supplied in the case of Physiography by the Honours Notes which have appeared in these columns for the past two years. And the many appreciative letters that have been received with reference to these notes justifies the belief that similar notes for Chemistry and a few other subjects would be read with interest, not only by students working for the examinations to which they respectively refer, but by everyone interested in the progress of science. Such notes will, therefore, form a part of each number, and it is believed that they will prove to be the most important feature of the section.

Finally, the section has been designed to meet the requirements of the 194,000 students in the 10,500 classes held in connection with the Science and Art Department. The one object of its Editor will be to assist each and every member of this vast army in some way or other. Any suggestions which will help on this desirable end will, therefore, be given the most careful consideration.

THE PHYSICAL CONDITION OF THE OCEAN.

IN his address to Section E (Geography) at the recent meeting of the British Association, Capt. W. J. L. Wharton, R.N., F.R.S., the president of the Section, gave an admirable summary of the present state of knowledge of the physical condition of the ocean. The subject is important, and it is treated so authoritatively that no apology is needed for the length of the following extracts. Every student of Physical Geography and of Physiography should read this abstract:—

The Bulk of the Ocean.

The very bulk of the ocean, as compared with that of the visible land, gives it an importance which is possessed by no other feature on the surface of our planet. Mr. John Murray, after a laborious computation, has shown that its cubical extent is probably about fourteen times that of the dry land. This statement appeals strongly to the imagination, and forms, perhaps, the most powerful argument

in favour of the view, steadily gaining ground, that the great oceans have in the main existed in the form in which we now see them since the constituents of the earth settled down into their present condition. When it is considered that the whole of the dry land would only fill up one-third of the Atlantic Ocean, the enormous disproportion of the two great divisions of land and sea becomes very apparent.

Ocean Currents.

The most obvious phenomenon of the ocean is the constant horizontal movement of its surface waters, which in many parts take well-defined directions. These great ocean currents have now been studied for many years, and our knowledge of them is approaching a point beyond which it is doubtful whether we shall ever much advance, except in small details. For though, while indisputably the waters continually move in each great area in generally the same direction, the velocities vary, the limits of the different streams and drifts vary, mainly from the ever-varying force and direction of the winds.

It may be now safely held that the prime motor of the surface currents is the wind. Not, by any means, the wind that may blow, and even persistently blow, over the portion of water that is moving, more or less rapidly, in any direction, but the great winds which blow generally from the same general quarter over vast areas. These, combined with deflection from the land, settle the main surface circulation.

The trade winds are the prime motors. They cause a surface drift of no great velocity over large areas in the same general direction as that in which they blow. These drifts, after meeting and combining their forces, eventually impinge on the land.

They are diverted and concentrated and increase in speed. They either pour through passages between islands, as into the Caribbean Sea, are pressed up by the land, and escape by the only outlets possible—as, for example, the Strait of Florida, and form a great ocean current like the Gulf Stream—or, as in the case of the Agulhas current and the powerful stream which runs north along the Zanzibar coast, they are simply pressed up against and diverted by the land, and run along it with increased rapidity. These rapid currents are eventually apparently lost in the oceans, but they in their turn originate movements of a slower character, which on again passing over shallow water or on meeting land develop once more into well-defined currents.

An analogous state of things is found on the western side of the Pacific, where the Japan current is produced in a similar manner. The fact that on all western shores of the great oceans towards which the trade winds blow we find the strongest currents running along the coast, is almost enough of itself to prove the connection between them. The westerly winds that prevail in higher northern and southern latitudes are next in order in producing great currents. From the shape of the land they in some cases take up and continue the circulation commenced by the trade winds; in others they themselves originate great movements of the water. Compared to the great circulation from this source the effect of differences of temperature or of specific gravity is insignificant, though no doubt they play their part, especially in causing slow under-circulation, and in a greater degree the vertical mixing of the lower waters.

The Depth of the Oceans.

First, as to the greatest depths known. It is very remarkable, and from a geological point of view significant, that the very deepest parts of the ocean are not in or near their centres, but in all cases are very near land. One hundred and ten miles outside the Kurile Islands, which stretch from the northern point of Japan to the north-east, the deepest sounding has been obtained of 4,655 fathoms, or 27,930 feet. This appears to be in a deep depression, which runs parallel to the Kurile Islands and Japan; but its extent is unknown, and may be very large. Seventy miles north of Porto Rico, in the West Indies, is the next deepest cast known, viz., 4,561 fathoms, or 27,366 feet; not far inferior to the Pacific depth, but here the deep area must be comparatively small, as shallower soundings have been made at distances sixty miles north and east of it. A similar depression has been sounded during the last few years west of the great range of the Andes, at a distance of fifty miles from the coast of Peru, where the greatest depth is 4,175 fathoms. Other isolated depths of over 4,000 fathoms have been sounded in the Pacific—one between the Tonga or Friendly Islands of 4,500 fathoms, one of 4,478 fathoms near the Ladrones, and another of 4,428 fathoms near Pylstaart Island, all in the Western Pacific. They all require further investigation to determine their extent.

With these few exceptions, the depth of the oceans, so far as yet known, nowhere comes up to 4,000 fathoms, or four sea miles; but there can be little doubt that other similar hollows are yet to be found. The sea with the greatest mean depth appears to be the vast Pacific, which covers 67 millions of the 188 millions of square miles composing the earth's surface. Of these 188 millions, 137 millions are sea, so that the Pacific comprises just one half of the water of the globe, and more than one-third of its whole area. The Northern Pacific has been estimated by Mr. John Murray to have a mean depth of over 2,500 fathoms, while the Southern Pacific is credited with a little under 2,400 fathoms. These figures are based on a number of soundings which cannot be designated otherwise than very sparse.

To give an idea of what remains to be done, it is enough to say that in the eastern part of the Central Pacific there is an area of 10,500,000 square miles in which there are only seven soundings, whilst in a long strip crossing the whole North Pacific, which has an area of 2,800,000 square miles, there is no sounding at all. Nevertheless, while the approximate mean depth mentioned may be considerably altered as knowledge increases, we know enough to say that the Pacific is generally deeper than the other oceans. The immensity, both in bulk and area, of this great mass of water, is difficult to realise; but it may assist us when we realise that the whole of the land on the globe above water level, if shovelled into the Pacific, would only fill one-seventh of it.

The Indian Ocean, with an area of 25,000,000 square miles, has a mean depth, according to Mr. Murray, of a little over 2,000 fathoms. This also is estimated from a very insufficient number of soundings.

The Atlantic, by far the best sounded ocean, has an area of 31,000,000 square miles, with a mean depth of about 2,200 fathoms.

The Temperature of the Oceans.

It will readily be understood that observations on temperatures at great depths require great care. In the first place the thermometers must be most carefully manufactured. They must be subjected to rigorous tests, and they must be carefully handled during the operation. All observations are not of the same value, and the discussion, therefore, presents considerable difficulty and demands much discretion.

In the equatorial current between Africa and South America, where the surface is of a temperature of 78°, at 100 fathoms it is only 55°, a difference of 23°, and a temperature of 40° is reached at 400 fathoms. In this region, so far as knowledge goes, the fall in temperature as we descend is most rapid, but generally speaking the same variations prevail everywhere. In the tropical Pacific the temperature falls 32° from the surface, where it stands at 82°, to a depth of 200 fathoms, 40° being reached at from 500 to 600 fathoms below the surface. Below the general depth of from 400 to 600 fathoms, the temperature decreases very slowly, but there is considerable variation in the absolute amount of it when we get to great depths in different parts of the ocean.

One of the most interesting facts that has been recognised is that in enclosed hollows of the ocean the bottom temperature is apparently much less than that of the stratum of water at a corresponding depth in the waters outside the submarine ridge that forms the enclosing walls, separating them from deeper areas beyond, and is, in all cases that have been observed, equal to that on the ridge. From this fact we are enabled to supplement our imperfect knowledge of depths, because if in a certain part of an ocean we find that the temperature at great depths is higher than we know exists at similar depths in waters apparently connected, we can feel certain that there is a submarine ridge which cuts off the bottom waters from moving along, and that the depth on this ridge is that at which is found the corresponding temperature in the outer waters.

A notable instance is the bottom temperature of the North Atlantic. This is nowhere below 35° F., although the depths are very great. But in the South Atlantic at a depth of only 2,800 fathoms the bottom temperature is but a little above 32° F., and we are therefore convinced that somewhere between Africa and South America, though soundings do not yet show it, there must be a ridge at a depth of about 2,000 fathoms. We also come to the same conclusion with regard to the eastern and western portions of the South Atlantic, where similar differences prevail. Again, the few temperatures that have been obtained in the eastern South Pacific show a considerable difference from those in the South Atlantic, and we are compelled to assume a ridge from the Falkland Islands to the Antarctic continent.

In the Western Pacific the water is colder, a few bottom temperatures of a little over 33° F. having been found in the deep trough east of the Tonga Islands; but the North Pacific, though the deeper ocean—of enormous area and volume—is apparently again cut off by a submarine ridge. The north-western part of the Indian Ocean is for similar reasons assumed to be divided from the main body, the shallower water probably running from the Seychelles to the Maldive Islands.

The Tides.

Lord Kelvin and Prof. Darwin have demonstrated that the tidal movement is made up of many waves depending upon differing

functions of the moon and sun, some being semi-diurnal, some diurnal. The time of transit over the meridian, the declination of both bodies, create great variations; the changing distance and position of the moon and the position of her node also have great effect, while the ever-varying direction and force of the winds and the different pressure of the atmosphere play their part, and sometimes a very large part, on what is somewhat loosely known as the meteorological tide. The amplitude of the oscillation of the water depending upon each of the astronomical functions varying for every point on the earth, the effect is that, each having a different period, the resulting mean movement of the water has most astonishing variations. In some places there is but one apparent tide in the day; in others this phenomenon only occurs at particular periods of each lunation, while in the majority of cases it is the movements of each alternate tide only that appear to have much to do with one another. Though after long observation made of the times and ranges of tides at any one spot, they can now be predicted with great accuracy, for that particular place, the meteorological tide excepted, by the method of harmonic analysis, perfected by Prof. G. Darwin, no one can yet say what the tide will be at any spot where observations have not been made.

The actual height of the tide in deep water is small, but on passing into shallow water when approaching a shore, and especially when rolling up a gulf of more or less funnel shape, it becomes increased by the retardation caused by friction, and by compression laterally, and hence the height of the tide on a coast affected by other causes is greater than in the open sea.

The oceanic tide wave is supposed to be from two to three feet in height, but as this has been assumed from observations made at small oceanic islands, where, although the magnifying influences mentioned are at a minimum, they still exist, we wait for precise information until some means of actually measuring the tide in deep water is devised.

Waves.

The waves due to wind, though not so far-reaching in their effects as the majestic march of the tide wave, are phenomena which are more apparent to the traveller on the ocean.

The height to which storm waves may rise has never been very satisfactorily determined. Apart from the difficulty of the task and the small number of people who will address themselves to it when they have the chance, it is but rarely that any individual sees really abnormal waves, even though he may be at sea all his life. Different heights for what are called maximum waves have been recorded, and they vary from 40 to 90 feet from crest to hollow. All we can say is that the most probable figure is about 50 or 60 feet. These great storm waves travel very far. In some cases they convey a warning, as their velocity always far exceeds that at which the storm is travelling. In others they intimate that a gale of which no more is seen has occurred somewhere—it may be many miles distant. When they have travelled beyond the limits of the wind which raised them, they lose the steepness of slope which characterises them when under its influence, and become an undulation which is scarcely noticed when in deep water. On approaching shallow water, however, they are again apparent, and the 'rollers' that occur unperiodically at various places in latitudes where gales never occur would seem to be caused by such waves, originating in areas many thousands of miles distant. Such appears to be the origin of the well-known rollers at Ascension and St. Helena, where the rocky and exposed nature of the landing has caused this phenomenon to be especially noticed.

Ocean Waves due to Internal Disturbances.

Many of the great and sudden waves which have caused devastation and great loss of life on the shores of western South America are referable to this cause. Observations to enable the focus of such a disburbance to be traced have generally been lacking, but it is probable that where the wave has been large the point of origin has not been far distant. In one notable instance the conditions were reversed. The point of origin was known, and the distance to which the resulting wave travelled could be fairly satisfactorily traced. This was the great eruption in the Straits of Sunda, in August, 1883, which locally resulted in the disappearance of the major part of the Island of Krakatoa, and the loss of nearly 40,000 lives, on the neighbouring shores of Java and Sumatra, by the huge wave which devastated them. The records of automatic tide gauges and the observations of individuals enabled the waves emanating from this disturbance to be followed to great distances. These waves were of great length, the crests arriving at intervals of about an hour, and moving with a velocity of about 350 miles an hour, were about that distance apart. The waves recorded at Cape Horn were apparently undoubtedly due to the eruption, and travelled distances of 7,500 miles and 7,800 miles in their course on either side of the south polar land. They were only five inches in height above mean level of the sea, while the waves recorded at places on the southern part of Africa, at a distance of about 5,000 miles from the scene of the eruption, were from one to two feet high, the original long waves being of an unknown height, but probably did not exceed ten or fifteen feet.

The Mean Level of the Sea.

Observations on the mean level of the sea show that it constantly varies, in some places more than others. In some localities it is plainly due to wind, as in the Red Sea, where the summer level is some two feet below that of winter, owing to the fact that in summer the wind blows down the whole length of the sea, and drives the water out. In many places, as in the great estuary of the Rio de la Plata, the level is constantly varying with the direction of the winds, and the fluctuation due to this cause is greatly in excess of the tidal action. In others the cause is not so clear. At Sydney, New South Wales, Mr. Russell found that during eleven years the level was constantly falling at about an inch a year, but by the last accounts received it was again stationary. The variations in the pressure of the atmosphere play an important part in changes of sea level. A difference of one inch in the barometer has been shown to be followed by a difference of a foot in the mean level of the sea, and in parts of the world where the mean height of the barometer varies much with the seasons, and the tidal range is small, this effect is very marked.

Of any secular change in the level of the sea little is known. This can only be measured by comparison with the land, and it is a question which is the more unstable, the land or the water—probably the land, as it has been shown that the mass of the land is so trifling, compared with that of the ocean, that it would take a great deal to alter the general mean level of the latter.

INORGANIC CHEMISTRY.

FIRST STAGE, OR ELEMENTARY EXAMINATION.

YOU are permitted to attempt only *eight* questions.

Whenever possible, you are to express the reactions in equations.

You are to give such numerical details as will show the mode of calculation.

H = 1; O = 16; Fe = 56; N = 14; K = 39; Na = 23.

1. Define the terms 'element,' 'compound,' 'atom,' 'molecule,' 'metal,' and 'non-metal.'

An element is a substance which has withstood all attempts to bring about its division into further constituents, and which cannot be formed by the union of other substances.

A compound is a substance which can be divided into or made by the union of two or more simpler substances.

An atom is the smallest particle of an elementary substance, indivisible either by mechanical or chemical means.

A molecule is the smallest particle of any substance (element or compound) capable of separate existence, and may consist of one or more atoms.

A metal is a member of the class of substances distinguished generally by being opaque, reflecting light well from polished surfaces, being good conductors of heat and electricity, and forming basic oxides.

A non-metal is a substance which does not possess all the characteristic physical properties of a metal, and which (fluorine excepted) combines with oxygen to form either neutral oxides or anhydrides (oxides which with water form acids).

2. What is a chemical equation? Indicate all that is implied in the equation $H_2 + O = H_2O$.

A chemical equation is an equation in which the symbols or formulæ on the one side represent the substances reacting and their quantities, and the symbols or formulæ on the other side represent the products of the reaction and their quantities. In every chemical equation the number of atoms of any element represented must be the same on both sides of the equation, and hence (*a*) there are equal numbers of atoms on both sides of the equation, and (*b*) the sum of the weights of the substances represented on the one side must equal the sum of the weights represented on the other side.

In the equation $H_2 + O = H_2O$, it is implied that,—

(1) Hydrogen and oxygen combine to form water.

(2) One molecule of hydrogen, consisting of two atoms, combines with one atom of oxygen to give one molecule of water, consisting of three atoms.

(3) Two parts by weight of hydrogen combine with sixteen parts by weight of oxygen to form eighteen parts by weight of water.

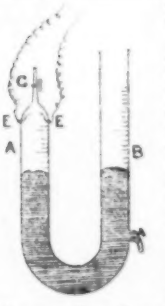
(4) Two volumes of hydrogen combine with one volume of oxygen to form water which, as steam, will occupy two volumes. (Note.—Strictly speaking, an equation in which some of the substances are represented as molecules and some as atoms cannot indicate volume relations.)

3. Describe some experiments which would serve to show that chemical combination takes place in definite and multiple proportions.

(In answering this question it is obviously useless to quote the laws of definite and multiple proportions and then give a string of formulæ of the compounds usually employed to illustrate the law of multiple proportions; nothing less than reasonably detailed descriptions of some two or three actual experiments will suffice.)

That chemical combination takes place in definite proportions may be shown experimentally as follows :—

Into the limb A of the Hofmann's eudiometer a quantity of hydrogen is introduced ; the levels of the mercury in A and B are made to coincide by drawing off mercury through the tap D, or adding it to B ; when the pressure is thus made to be that of the outer atmosphere, the volume of hydrogen is read off on the graduated scale etched on the limb A. A quantity of oxygen is now added and, the levels being again adjusted, the total volume of the mixed gases ascertained. An induction spark is now passed between the platinum points E E, causing the explosive combination of the hydrogen and oxygen. After allowing the apparatus to cool, the volume of gas left is read off after again adjusting the mercury levels, and the kind of gas remaining is tested by adding mercury to the limb B, opening the tap C, and applying a lighted splint to the issuing gas. Whatever the proportions of the hydrogen and oxygen taken may be, it is always found that two volumes of the former have combined with one volume of the latter to form water condensed on the sides of A. If one of these gases be in excess of this proportion, the excess of that gas is found as a residue uncombined at the conclusion of the experiment. Hence in this case chemical combination takes place in the definite proportions by volume of 2 of H to 1 of O.



That chemical combination takes place in multiple proportions may be experimentally shown by means of the same apparatus used in the way detailed above for the combustion by explosion of the gases ethane, ethylene, and acetylene with an excess of oxygen.

The volumes of the gas and of the mixture of gas and oxygen are recorded as before ; the volume of the residual gas after explosion is then noted. This residual gas consists of carbon dioxide, together with the excess of oxygen. To ascertain the amount of carbon dioxide, pour into the limb B a little concentrated solution of sodium hydrate and fill up with mercury, place the thumb (protected by an indiarubber stall) over the mouth of B so that air is excluded, and pass the gas by inclining the apparatus backwards and forwards from A to B ; when the absorption of carbon dioxide by the sodium hydrate appears to be complete, collect the gas in A, adjust the mercury levels, and record the volume of the residual oxygen. The volume of carbon dioxide is the difference between the volumes recorded before and after absorption by sodium hydrate ; if equal volumes of each combustible gas be taken, equal volumes of carbon dioxide are obtained, in each case twice the volume of the gas taken. Hence equal volumes of these three gases contain the same quantity of carbon. Represent the volume of the combustible gas by 2, then as the contraction on explosion is due to the disappearance of the two volumes of gas, together with the amount of oxygen required to form water with the hydrogen in the gas (the oxygen used for producing CO_2 is replaced by the same volume of the latter), and as the actual contractions observed after explosion of two volumes in each case of ethane, ethylene, and acetylene are five volumes, four volumes, and three volumes respectively, the corresponding volumes of oxygen combining with hydrogen are 3 : 2 : 1, and the corresponding quantities of the hydrogen itself are 6 : 4 : 2 volumes. Hence, in the case of the gases ethane, ethylene, and acetylene, the same quantity of carbon combines with hydrogen in such proportions that the quantities of hydrogen in the two former are simple multiples of the quantity in acetylene.

4. Write the names for $ZnSO_4$, NaCl, MnO_2, $KClO_3$, FeS, FeS_2, $CuSO_4$, KNO_3, $Cu2(NO_3)$, $NaHSO_4$, NH_4Cl, $CaCO_3$.

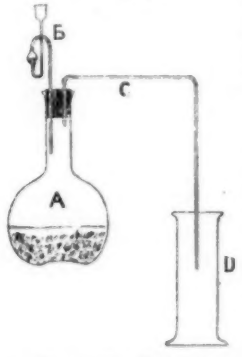
$ZnSO_4$, zinc sulphate ; NaCl, sodium chloride ; MnO_2, manganese dioxide ; $KClO_3$, potassium chlorate ; FeS, ferrous sulphide ; FeS_2, iron pyrites ; $CuSO_4$, cupric sulphate ; KNO_3, potassium nitrate ; $Cu2(NO_3)$, cupric nitrate ; $NaHSO_4$, sodium hydrogen sulphate ; NH_4Cl, ammonium chloride ; $CaCO_3$, calcium carbonate.

5. How is chlorine prepared? State what you know respecting its colour, smell, solubility in water, its action on metals, and its behaviour towards colouring matters.

Chlorine is best prepared for laboratory purposes by the action of slightly diluted sulphuric acid on a mixture of sodium chloride and manganese dioxide, in accordance with the equation

$$2NaCl + 3H_2SO_4 + MnO_2 = MnSO_4 + 2NaHSO_4 + 2H_2O + Cl_2.$$

A mixture of five parts manganese dioxide with four parts common salt is put in the flask A, and a cool mixture of six parts water and twelve of concentrated sulphuric acid is poured on through the safety funnel B. The evolution of the gas is hastened when necessary by heat from a bunsen burner. Chlorine, very nearly dry, is delivered through the tube C, and collected by displacement of air in the gas-jar D. If the gas be required free from HCl, it is washed by passing through a little water in a small Woulfe's bottle, and then dried before collection by passage through a tower containing glass balls moistened with concentrated sulphuric acid.



Chlorine has a greenish yellow colour and an irritating and peculiar smell. Water dissolves from two to three times its own volume of the gas. Most metals are rapidly acted on by chlorine with the production of chlorides ; if in a finely divided state, the commoner metals become incandescent from the vigour of the reaction. Organic colouring matters in the presence of moisture are bleached by chlorine ; the bleaching action appears to be due to oxidation by oxygen at the moment of its liberation, the oxygen being set free by the combination of chlorine with the hydrogen of some of the water present.

6. Two bottles are given to you, one of which contains carbon monoxide, the other carbon dioxide. By what tests or experiments could you identify the gases ?

(The experiments must be described and not merely mentioned, and they must be sufficiently illustrative of the properties of each gas to enable them to be clearly distinguished from all other common gases.)

Carbon monoxide and carbon dioxide could be identified by the following experiments :—

(1) Add to each bottle a little fresh lime-water, and shake after quickly replacing the stopper. The bottle in which the lime-water becomes milky contains the carbon dioxide, the other requires to be further tested to prove the presence of carbon monoxide.

(2) This may be done by removing the stopper and applying a lighted taper, when the gas burns with a pale blue flame. So soon as the flame dies out, replace the stopper and shake ; the lime-water will now become milky owing to the formation of carbon dioxide by the combustion of the carbon monoxide.

7. What volume of hydrogen at the standard temperature and pressure could be obtained by the solution of 14 grams of pure iron in dilute sulphuric acid ?

Iron dissolves in dilute sulphuric acid in accordance with the equation $Fe + H_2SO_4 = FeSO_4 + H_2$.

Hence 56 grams of iron liberate 22·4 litres of hydrogen at the standard temperature and pressure, and 14 grams of iron must liberate $\frac{22{\cdot}4 \times 14}{56} = 5{\cdot}6$ litres.

8. Describe fully how the composition of water by weight has been determined.

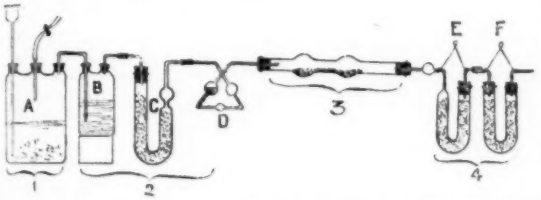
(In the elementary stage a fair general description noting the most important points of the method should gain high marks. A complete detailed account of the fitting up and employment of the

more refined apparatus necessary for a really accurate determination cannot be very well expected.)

The composition of water by weight may be most conveniently determined by heating a weighed portion of dry copper oxide in a current of pure dry hydrogen, and collecting and weighing the water produced by the reduction of the oxide.

$$CuO + H_2 = H_2O + Cu.$$

Here we have (1) to produce the hydrogen, (2) to purify and dry it, (3) to pass it over red-hot copper oxide, contained in some closed vessel which can be readily weighed when cool both before and after the experiment, (4) to collect the water-vapour produced in weighed tubes containing suitable absorbents, and to weigh these tubes after the experiment to ascertain the increase in weight due to the absorbed moisture. The diagram below illustrates an apparatus suitable for this experiment; the sections are marked with numbers corresponding with their functions as given above.



Hydrogen is produced in A from zinc and dilute sulphuric acid. The gas is washed by passage through sodium hydrate solution contained in B, and dried by means of sulphuric acid on pumice-stone in C, and its rate of flow observed on its passage through a little sulphuric acid in the bulb-tube D. The reaction occurs in the weighed tube 3, which is heated by burners after the hydrogen has expelled all air from the apparatus. The tubes E and F contain pumice-stone moistened with concentrated sulphuric acid, the moisture formed in 3 is here absorbed, and then its weight determined by the difference of weight of E together with F before and after the experiment. The loss of weight in 3 gives the amount of oxygen used in producing this quantity of water-vapour, and hence the percentage composition of water is calculated.

9. What does a diamond consist of? What tests would enable you to distinguish it from glass?

Carbon. A diamond can be distinguished from glass by its hardness and by its behaviour when heated strongly in a current of oxygen. The hardness of diamond is such that it readily scratches glass, but a piece of hard steel which easily marks glass makes no impression on the surface of the diamond. Glass simply melts when heated, and then suffers no change in the oxygen, whereas diamond swells up and burns, forming carbon dioxide, which is detected by passing the current of gas through a little fresh lime-water.

10. How is nitric acid prepared? How much nitric acid should be theoretically obtained from 1,000 grams of each of the following nitrates: Ammonium nitrate, potassium nitrate, sodium nitrate?

Nitric acid is prepared on the large scale by heating together sodium nitrate and sulphuric acid in large cast-iron retorts, and condensing the evolved nitric acid in a series of large cooled Woulff's bottles made of acid-resisting stoneware. The reaction is represented by the equation $NaNO_3 + H_2SO_4 = NaHSO_4 + HNO_3$. A greater proportion of nitric acid could be obtained by adding double the amount of nitrate, but the higher temperature required causes considerable loss owing to decomposition of a part of the nitric acid produced. The sodium hydrogen sulphate is removed by scraping out while still molten through the back of the retort, which is formed of a removable stone slab, and a fresh charge is at once introduced, the back sealed on, and sulphuric acid added. The process then proceeds as before.

$$KNO_3 + H_2SO_4 = KHSO_4 + HNO_3.$$
$$NaNO_3 + H_2SO_4 = NaHSO_4 + HNO_3.$$
$$*NH_4NO_3 + H_2SO_4 = NH_4HSO_4 + HNO_3,$$

assuming no decomposition of the ammonium salts to occur.

Hence, from $(39 + 14 + 3 \times 16)$ grams of potassium nitrate,

or from $(23 + 14 + 3 \times 16)$ grams of sodium nitrate,

or from $(14 + 4 + 14 + 3 \times 16)$ grams of ammonium nitrate,

we obtain $(1 + 14 + 3 \times 16)$ grams of nitric acid.

* At about 200° C. Nitrous oxide is evolved if the temperature is rapidly raised to 260° C.

Therefore, from 1000 grams in each case we obtain

$$(KNO_3) \quad \frac{63 \times 1000}{101} = 623{\cdot}76 \text{ grams.}$$

$$(NaNO_3) \quad \frac{63 \times 1000}{85} = 741{\cdot}176 \text{ grams.}$$

$$*(NH_4NO_3) \quad \frac{63 \times 1000}{80} = 787{\cdot}5 \text{ grams.}$$

11. What is the substance formed by burning oxygen in hydrogen? By what tests or experiments could you establish the identity of the product?

(Here the tests given must be practicable, and must be such as will distinguish the product from other mobile liquids.)

Water. It is identified by the following:—

(1) The freezing and boiling points are determined; for water these are respectively 0° C. and 100° C.

(2) A little is warmed in a test tube and it is noted to be without odour; on boiling, the vapour does not ignite when brought in contact with a flame.

(3) It is observed to be a colourless liquid devoid of taste.

(4) A small piece of potassium floats on its surface, giving off a gas, which is ignited by the energy of the reaction and burns with a rose-coloured flame.

(5) A little white anhydrous copper sulphate is added to the liquid; the water immediately turns it blue and then dissolves it, forming a blue solution.

(6) Potassium permanganate is dissolved by water to form a purple solution, opaque excepting in thin layers.

12. How would you demonstrate the existence of hydrogen in ammonia; in sulphuretted hydrogen; and in hydrochloric acid?

The existence of hydrogen in ammonia can be proved by the aid of Hofmann's eudiometer (see Q. 3). A little dry ammonia gas is introduced into the limb A, and a number of electric sparks passed between the platinum points by means of a secondary coil. The ammonia is thus decomposed into nitrogen and hydrogen. Mercury is added to the limb B, and on opening the tap C the gas passes out and may be ignited with a taper. It burns with a feeble flame, and a cold porcelain crucible lid held over this flame condenses on its surface some drops of a liquid, which is proved to be water by the intense purple colouration imparted to it by a crystal of potassium permanganate.

The presence of hydrogen in hydrochloric acid may be shown by means of the same apparatus.

Dry hydrogen chloride is introduced into the limb A, sodium amalgam is added to the limb B, which is then filled up with mercury, and the gas passed from limb to limb several times, with the thumb closing B to prevent the access of air. The sodium decomposes the hydrogen chloride, liberating hydrogen and forming sodium chloride. The hydrogen is returned to limb A, mercury added to B and the gas burnt, the product being proved to be water by testing as before.

Hydrogen may be proved to be present in dry hydrogen sulphide, or sulphuretted hydrogen, by burning the gas and aspirating the products of combustion through a U-tube surrounded by ice. A liquid is collected which, as soon as obtained in sufficient quantity, is boiled to expel sulphur dioxide and then proved to be water by taking its boiling-point (by immersion of a thermometer in its steam), or by colouration with permanganate.

* At about 100° C. Nitrous oxide is evolved if the temperature is rapidly raised to 160° C.

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SYNOPSIS
OF
ADVANCED CHEMISTRY

Adapted to the Syllabus of the Advanced Stage, Science and Art Department, South Kensington.

BY W. J. STAINER,

Second Master, Higher Grade & Organised Science School, Brighton.

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PHYSIOGRAPHIC CURIOSITIES FROM EXAMINATION PAPERS.

BY ALBERT TAYLOR, A.R.C.S., A.R.S.M., F.R.A.S.

I ONCE heard an exasperated teacher of Physiography, disappointed at the results obtained by his class in that subject, declare his conviction that the fate of each paper was determined somewhat as follows :—A respectable gentleman sits at a table with a pile of examination papers on one side, and a hat on the other, containing a number of labels equal to the number of papers, some of the labels being marked 'First,' others 'Second,' and the larger part 'Fail'; he lifts a paper, and blindly draws a label which he quietly pins to the paper, the fate of which is thus decided. Could that teacher see the actual process of examination his wrath would be diverted from the painstaking examiner to the careless and inattentive examinee, the unintelligent teacher, or the demands of a syllabus too extensive to admit of properly detailed study.

Onerous as the work of an examiner undoubtedly is, it is occasionally relieved by flashes of unconscious humour in the papers, and by awful examples of the result of the attempt to assimilate too many crude facts. A few examples selected from several hundreds I have collected during the last five years may serve to show what the long-suffering examiner has to put up with, and to explain the large proportion of failures.

Many of the blunders are obviously due to random shots fired in the desperate hope of hitting the mark. In this class we may put the ingenious guesses that 'A mean solar day is when our meridian is pointing to the stars that are overhead at the Mediterranean Sea'; that 'The two commonest elements in the earth's crust are Fauna and Flora. Fauna is animals that have died and gone out of use. Flora is flowers, etc. dying and new ones coming up and taking their places'; that 'Newton's first law of motion is the further a body goes the greater is its velocity'; that 'The greatest rainfall subtracted from the least gives the mean annual rainfall;' that 'The chief elements of a planet's orbit consist of the gases sulphunide hydrogen, carbonic acid, and sulphate of Oxyde;' and that 'The commonest elements in the earth's crust are gold and silver.'

Occasionally the student seeks to hide his ignorance by a display of profound erudition. One of these tortures the examiner with the announcement that 'The glow which is seen above a volcano is light and fire in the interior of the earth which strikes against an invisible substance called by men in the Physiography profession Ether. This invisible Ether is what gives us our light. The sun's rays fall upon the Ether which is in the air and the light is reflected on our own Earth by the Ether.' Another gravely writes, 'Planets describe orbits which are elliptical in shape. If the orbit forms a parable or hyperbole it is only seen once, but if it forms an ellipse it is seen more often,' while a third informs us that 'The shape of the earth's orbit has been determined by men who have sailed round it, and when engineers construct a canal they have to allow for the spherical shape of the earth's orbit.'

The examiners have recently asked the students to define Force, Energy, Momentum, and Stress, and some of these definitions have been asked for more than once. The extraordinary definitions that have been given are sufficient justification for this insistence, even if we disregard the fact that some teachers purposely omit to teach the points raised in the last paper, relying on the supposition that the same question will not occur in two consecutive years.

'Force is the power which one body has of keeping another body fixed according to its will.'

'Force is the name given to different abstract things.'

'When a person stretches himself beyond his natural strength he is said to use force.'

'Force is strength, Energy is life, Momentum is speed, stress is accent.'

'Force means emphasis, and the word energy is derived from the word ergo, which means an organ.'

'Force is the divine human of a farmiliar (*sic*) body and Momentum is the folly fall (*sic*) united to any system.'

'Energy is the power of doing work possessed by any body either in virtue or its motion.'

'Energy is the capability to move without aid which some bodies possess.'

'Momentum is the interval elapsed by the sudden stoppage of a body when in motion.'

'Momentum is the product of folossity (*sic*) of a mass of a body.'

'Momentum is a truck on a line knocking against another one at rest.'

'Momentum is a division of time.'

'Momentum is the time given by a clock.'

'Momentum is to do the thing at once without thinking about it.'

'Stress is the emphasis laid on a word.'

'Stress is a lump of clay struck by a mallet.'

One student stumbled on a great philosophical truth in these definitions, and wrote, 'Force is the power which makes us do our work, and stress is the power by which we do our work.'

The eternal time question brings forth another large crop of curious facts. 'The Equation of time is 24 hours. Its use is to enable employers to have a fixed time for work and pay the men accordingly by.' 'The Equation of time is the time occupied by the precession of the equinoxes.' 'By Equation of time we mean the time between the equator and the North and South Poles. The use of this is to tell the people at the poles.' 'By the equation of time we mean that the earth turns round on its own axis once in every 365¼ days.' 'The Sun is the Equation of time.' 'The meaning of mean time is at the present time, for instance if you want to do a think (*sic*) and have not the apparatus for doing it you wait till us (*sic*) get the things and do something in the *mean time*.' 'Mean time is the time which terminates at Greenwich.' 'Mean time is the interval between the transitive of the sun on the marry den (*sic*).'

Some extraordinary facts which should not be lost to science are buried in these rejected answers. 'Silica is a queer sort of clay.' 'Oxygen is an invincible gas.' 'Oxygen is a great supporter to the interior of the earth.' 'Elements are existed by the prespiration (*sic*) of organically formed substances.' 'If we have 100 parts of air 97 of these are oxygen and 125 are hydrogen.' 'The chief causes of evaporation are the sun and moon, and the moon has the greater effect because it is nearer than the sun.' 'The most abundant oxide in the earth's crust is the water's orbit.' 'An oxide is a certain quantity of something else.' 'Glaciers send out hot water from the interior of the earth.' 'The plane of the earth's equator is inclined to the plane of the ecliptic at right angles; the amount of that inclination is 212°.' 'The planes of the equator and the ecliptic are inclined because the heat from the equator attracts the ecliptic and makes it incline towards it.'

'Mercury is used in the thermometer because it is a valuable solvent.' 'The Arctic regions are called the land of the rising sun, and the sun is directly over the north pole and the reason why they have days so long is that the rotation of the earth gradually decreases as it nears the poles.'

'The fixed stars are supposed to be planets shining by the reflected lights of their satellites.'

'The sun acts as a magnate.'

'If the earth left the atmosphere we would all be dizzy and knocked down on our back *with our legs south*, as if a train had stunned us and also we could not breathe.'

A few other facts about volcanoes are too precious to be missed. 'There is a rough (*sic*) in the volcano when it begins to burst.' 'The sound of a volcano is very miserable.' 'The heat from a volcano would be so intensely hot that the indication which would be given by a thermometer would be *blood* heat.' 'A learned man was let down the vent of an erupting volcano and he found it was very much hotter than at the surface.'

A singularly lucid description of how to construct a telescope should be of immense service to teachers. 'An iron case made so as to fix inside one another to work up and down according to how far you want to view or how close you want it, but make it so that it will not come right out; then put three lenses in one at the end another in the middle and another at the other end and then you have the telescope complete.'

Occasionally the student is evidently as much astonished at the questions as the examiner is at the answers, but few have the hardihood to write, 'If you please sir excuse me being so impudent as to say astronomy is not physiography. For my own part I have never heard of a (*sic*) achromatic astronomical telescope.'

RECENT WORK IN TERRESTRIAL MAGNETISM.

THAT the earth is a magnet is an elementary text-book truism, and the student is no doubt aware of the chief facts of its magnetization. It is by no means an ideal magnet with poles coincident with the axis of the earth. Except in a few situations, therefore, the magnetic needle does not lie in the meridian, but is inclined to this at an angle spoken of as its *declination*. This declination, as we shall presently show, varies in an irregular manner from year to year. The position of the magnetic poles also varies. At present the chief focus in the northern hemisphere has its position a little to the north of Hudson's Bay, in lat. 70° N. long. 96° 43′ W., and there is a minor focus in Siberia. The south magnetic pole is probably situated about lat. 75° S. and long. 150° E., but its position has not been exactly determined. (See map in 'Elemy. Physiog.,' p. 384.)

In addition to the slow permanent changes just alluded to, the declination has rhythmic variations which take a period of a year to complete, and also other variations which recur daily. In the past there has been a disposition to regard the great and steady changes in declination as also probably periodic, and due perhaps to a slow rotation of the axis of the earth magnet around the earth's axis of rotation. The general drift of work in terrestrial magnetism for many years past has been to separate the effects of known disturbing causes in order to elucidate any larger periodic movement that might occur.

At present, rather than arrive at conclusions, the investigation has so far resulted in the discovery of fresh sources of error and the creation of new doubts. One matter that has come to light is the singular *unreliability of many magnetic appliances*. There is for instance a remarkable case of a dip circle at Colába, in Bombay. On three occasions between 1872 and 1892 this instrument has been altered. In 1877 the plates of agate in which the dip needle rolled were renewed. In 1881 and again in 1887 the circle was rebuilt. After the first overhauling the indications of dip altered 12′, in the second 23′, in the third 20′. Presumably this marked an error that had gradually crept into the instrument. Professor Rücker can give no adequate explanation, but he thinks a warning may be drawn from this that similar errors may be creeping unsuspected into the results of other observations. It is scarcely a thing due to the wear of the parts, for a similar instrument used by him and Professor Thorpe has remained in accord with Kew for ten years.

Next to the unreliability in implements and the need for more frequent standardising, comes the difficulty arising from *differences in the methods of observation at different observatories*. It has been thought, for instance, that the diurnal range differs in different places. In 1886 the late Mr. Whipple drew the attention of the British Association to the fact that there was apparently a systematic difference between the diurnal ranges of declination at Greenwich and Kew. His results were based on the years 1870–72. In 1890 two of Professor Rücker's students confirmed these results by comparing the years 1883–6–7. These great discrepancies which have been noticed between the records of different observatories may be due to the difficulties that beset observation in anything approaching to similar conditions. The average daily oscillation of the magnet is largely affected by the magnetic weather. Sabine showed that magnetic storms do not merely give irregular impulses to the needle, but that they affect its average behaviour, so that if the mean swing east and west is deduced only from days of magnetic calm the result will differ from that obtained by including days of storm. To test this Mr. Whipple obtained two sets of observations from Kew. In one only the calmest days were taken, and in the other were included days of moderate disturbance. The difference between these results was so small when compared with the difference between either and that obtained at Greenwich that it seems probable that the diurnal variations even at places so close together as these might appreciably differ. But this question has now been settled by absolutely identical methods of record. Greenwich and Kew have compared their observations made on precisely the same quiet days, and this discrepancy in the matter of diurnal variation has disappeared.

But while such sources of error in observation are being cleared away the problem of secular magnetic variation remains still obscure. The tendency to ascribe this variation to some large periodic rotation of the earth's magnetic poles is gradually passing away. Professor Balfour Stewart considers that neither the pole of verticality nor the centre of force in North America has perceptibly changed its position, and that the motion of the Siberian focus has been not rotational but oscillatory. By a comparison of the magnetic maps of the world prepared by Sabine and Creak for the years 1840 and 1880 respectively, his conclusion is reinforced. *There is no evidence of any motion either of magnetic pole or focus.* There are certain lines on the surface of the earth towards which in the interval under consideration the north pole of the needle was attracted. From each side the compass veered or backed towards them. Above them the north pole of dip needle moved steadily down.

The old theory has thus been exploded, but a feasible new one is still to seek. There is no doubt that the facts recorded cannot be explained by any simple theory of a rotating or oscillating pair of poles. They suggest that the secular change or yearly variation is due not so much to changes at the principal magnetic points, as to *the waxing and waning of the forces apparently exerted by secondary lines or points of attraction or repulsion.*

Mr. Horace Wilde has attempted a more sweeping explanation by means of a model. He has placed two systems of currents within a globe, and imparted to one a motion of rotation about the polar axis of the earth. By this means he has produced a rough approximation to the general system of isogonic lines. He has, however, had to supplement this arrangement of local features by coating the seas, for instance, with thin sheet iron. And so we come back to local differences again.

Local differences must certainly have an important influence in all cases. All down the west coast of America and close to one of the great lines of volcanic activity, north hemisphere magnetism has been growing since 1840 in relative importance, while a weak pole is developing near Cape Horn of the same kind as the pole near Hudson's Bay. Along a line from Newfoundland to the Cape of Good Hope just the reverse effects have been noted, while in the Gulf of Guinea a south hemisphere pole has been growing in intensity. It is not suggested that these secondary systems will ever greatly affect the principal phenomena of terrestrial magnetism, but local perculiarities such as these must have much influence on such minor variations as that of secular change, even if their primary cause be proved to be earth currents or a change of magnetic conditions outside it.

Any conclusions on this difficult subject would be premature in the present state of our knowledge. More detailed observation and comparison between results obtained at stations close to one another may throw light on the action of these local causes. In comparing Kew and Greenwich it is found that the declination needles at the two places do not from year to year run parallel courses. Between 1880–2 Kew outstripped the other, while between 1885 and 1889 it lost. Many other instances like this have been observed.

The earth seems alive with magnetic forces. The sudden variations which affect the diurnal sweep of the magnet occur simultaneously at places far apart, and from this may be supposed to be of extra-terrestrial origin. But there seems to be a slower agency which disturbs the secular change, and whose action is confined within narrow limits of space. Between several places on the British Islands 'the measured differences of secular variation are so large as to suggest that we are dealing not with an unruffled tide of change, which, unaltered by its passage over continent or ocean, sweeps slowly round the earth, but with a current fed by local springs or impeded by local obstacles, furrowed on the surface by billows and eddies, from which the magnetician, if he will but study them, may learn much as to the position and meaning of the deeps and shallows below.' But there is much yet to be done before these views can be accepted for fact, and in the first place we want a systematic and repeated comparison of the standard instruments in use at the various observatories. It is certain that they are not in accord. *If the relations between them are constant the above suggestions are probably correct, if they vary then much or the whole of the apparent fluctuations of secular change may only be due to the irregular shiftings of inconstant standards.*

THE REPORT OF THE DEPARTMENT OF SCIENCE AND ART.

THE Report of the Department of Science and Art, for the year 1893, has lately been issued. Subjoined is a summary of the chief points of interest to our readers.

Compared with the previous year, the number of science schools under the Department in 1893 had increased by 201—from 2,553 to 2,754—and the number of pupils had increased by about 13,000—from 180,410 to 193,431. But the number of classes in different branches of science had decreased by 11—from 10,352 to 10,341. This decrease was doubtless due to the abolition of payments on results for a second class in the Elementary Stage. Many classes in which instruction of a very elementary nature had been given were closed or ceased to have any connection with the Department when the new rule came into operation.

Of the 193,431 pupils under instruction in 1893, 189,318 came within the category of those on account of whose instruction payments on the results of examination were made by the Department.

In the following table are given, for the three years 1891–93, the number of students examined, the number of papers worked, the number of papers which were passed in one class or another, and the number which obtained a first class in the Elementary or in the Advanced Stage.

Year.	Persons examined.	Papers worked.	Papers passed.	First Classes.
1891 ...	93,659 ...	179,549 ...	115,610 ...	28,448
1892 ...	108,858 ...	203,347 ...	136,778 ...	35,932
1893 ...	110,398 ...	201,597 ...	83,511 ...	46,099

It will be seen from this that there was a considerable fall in the number of successful papers, but this was compensated to some extent by an increase in the number of first classes. The payments on the results of the examinations, however, amounted to £130,009, or £6,362 more than in 1892. The average payment for each paper

worked at the examinations in 1893 was 12s. 10¾d., whereas in 1892 the average was 12s. 1¾d. And the average for each individual student sent up for examination was £1 3s. 6½d., as against £1 2s. 8½d. in the preceding year.

The subjects in which more than five thousand papers were worked, are as follows :—

Practical Plane and Solid Geometry *	31,755
Mathematics	28,099
Inorganic Chemistry	21,054
Physiography	18,699
Machine Construction and Drawing	15,363
Magnetism and Electricity	13,234
Inorganic Chemistry (Practical)	12,628
Human Physiology	8,015
Building Construction	6,279
Hygiene	6,048
Principles of Agriculture	6,045
Applied Mechanics	5,246

Some important developments bearing on science instruction, and either proposed or already in operation, are thus set forth in the Report :—

'At present in England and Scotland the only State-aided schools apart from the University Colleges which are devoted to the higher education—in which a near approach to Secondary Education on the scientific side is given, are the Organised Science Schools, aided by the Department. In these not only Science and Art but also literary and commercial subjects are taught in varying amounts, the proportion between the two not being under official control, though a minimum time for Science instruction is insisted upon. The importance of these schools has been brought prominently before us by the large increase in their number—such increase being very largely due to those started in the provinces. Ten years ago there was only one of these schools. Six years later there were 40, and during the last four years their number has increased to 93. If the energies of this class of school can be directed not merely to grant-earning on science instruction but to really effective educational methods, they may in some measure fill that gap in the education system in England which exists and to which we have already referred.

'So long as the present system of payments on results is adhered to in its entirety there is a danger of the neglect of those subjects which are not included in the Department's Directory, and of their being made subordinate to instead of co-ordinate with them. With the knowledge before us obtained by the experience of some years' work of what some of these schools can do, and of what public opinion demands all should do, we are endeavouring to frame regulations for their conduct which, while making the science course more effective, will insist that an adequate part of the school hours shall be devoted to a study of those subjects without which the education in the proper sense of the word given at these institutions must be incomplete.

'With a view to improving the supervision of Science Instruction given under the Science and Art Department, and also so far as possible with a view to further co-operation with Local Authorities, we obtained at the close of the year with which this report deals the necessary sanction of the Treasury to the appointment of 13 new inspectors, making 17 in all. This change involves the withdrawal of a certain number of temporary inspectors. This addition to the permanent staff of the Department has enabled us to divide Great Britain and Ireland into districts, in each of which an inspector is located. He is primarily responsible for the inspection of the schools under the Science and Art Department, and also for the supervision of the temporary local Art Inspectors who are employed in the examination of Art and Manual Instruction in the Elementary schools in his district. There can be no doubt of the great advantage that must accrue to the Department by having responsible officers to represent it in the different parts of the country. They will be able to keep it better informed of the needs of the different localities, and it is hoped that they will be looked upon as advisers in all matters connected with Science and Art instruction within their districts. This function of an Inspector was difficult adequately to perform when the Inspectorate was so limited in number. It is also to be hoped, and indeed we have already indications that such will be the case, that the Inspectors may be further able to aid the different local authorities, who administer the funds which are distributed in grants for technical education, by undertaking the inspection of some of their classes. It is our desire that they should co-operate with the officers of these bodies in order that all science instruction whether technical or otherwise, may be most efficiently and economically carried out.

'In some subjects of science aided by the Department we are of opinion that the instruction given is not sufficiently practical. Although the Department has endeavoured with the staff which has been up till now at its command to insist as far as possible on practical work, yet to test its efficiency has been beyond its power except by examination in the Honours Stage of some few subjects. The additional staff of Inspectors has, however, made it practicable to supervise and inspect the practical instruction which may be given at the various schools, and we hope to arrive at some plan by which laboratory work in physical and biological science may be encouraged and eventually made to form a necessary part of the instruction in these branches of natural knowledge.'

The Report shows that Mr. Acland has made some desirable changes in the working of the Department. Doubtless the time will come when the system of payments on the results of examinations will have given place to one in which the needs of teachers are more humanely considered. When that day arrives, it will not be necessary to cram students with scraps of knowledge which they can never digest, in the hope that some of it will be remembered at the examination. Let the authorities who have these matters under their control remember that by improving the present position of teachers they will benefit science. A wise step has been taken in the appointment of the Inspectors referred to in the foregoing. It is to be hoped that these gentlemen will co-operate with, and consider the difficulties of, the teachers in their districts, and not degenerate into mere Departmental machines.

* This number includes 20,918 papers worked in Geometrical Drawing.

Chemistry.

A Supposed New Element.—Considerable interest was excited in the Chemical Section of the British Association at the recent meeting at Oxford by the statement by Lord Rayleigh and Professor Ramsay that they had detected and isolated a new gas, supposed to be elementary, in the atmosphere. 'Some time ago,' says the *Chemical News*, 'Lord Rayleigh announced to the Royal Society that some anomalies in the densities of samples of nitrogen from different sources had led him to the conclusion that atmospheric nitrogen, carefully purified from every other known constituent of the air, was contaminated to the extent of about 1 per cent. with another gas, even more inert than nitrogen.' Since that time Lord Rayleigh and Professor Ramsay have been working in the endeavour to isolate the gas and determine its principal properties.

Two methods of preparing the gas have been devised. The first is to pass a series of high tension electric sparks through a mixture of air and oxygen (approximately equal bulks) confined in a eudiometer vessel over dilute caustic potash. The nitrogen and oxygen unite, forming nitrous and hyponitric acids, etc., which are absorbed by the potash, and if the sparking is long enough continued, and the oxygen is kept in slight excess, after a few hours a residue is obtained which suffers no further diminution in bulk by further passage of sparks. This residue is then purified from excess of oxygen by alkaline pyrogallate.

The second method of preparing the gas consists in passing air first over metallic copper at a red heat to remove the oxygen, and then passing the nitrogen over heated magnesium. The magnesium unites with the nitrogen to form a nitride, and the new gas is left behind. It may be advisable to get rid of the last trace of nitrogen by sparking with oxygen over potash, as in the first process. Inertness seems to be the chief characteristic of the new gas. Its density is 18·9, if allowance is made for solubility in water, or 20· if no allowance is made.

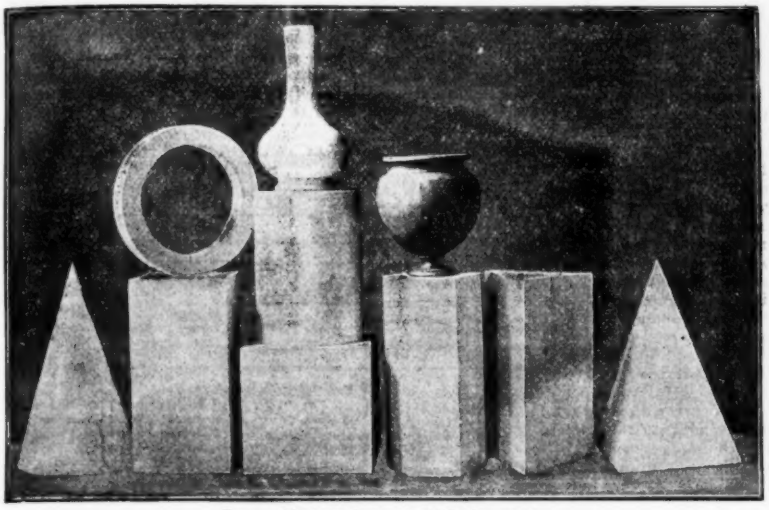
Professor Crookes has examined and photographed the spectrum of the gas, when the induction spark is passed through a tube containing it under an exhaustion of about 8 millims., and compared it with that of nitrogen under similar circumstances.

He says that the spectrum is a very definite and characteristic one, and the lines differ in position from those of nitrogen. The appearance more resembles a metallic spectrum, and no flutings similar to those of nitrogen are to be seen.

Chemists generally, however, are not satisfied with the evidence as yet adduced in support of the existence of the new element. Possibly the experimental results obtained may be due to the production of an allotropic form of nitrogen analogous to ozone ; they can also be explained by supposing that the new substance is a mixture of nitrous oxide and nitrogen. Professor Dewar inclines to the opinion that the former is the explanation, and that 'the new substance is being manufactured by the respective experimenters, and not separated, as they imagine, from the ordinary air.'

Physiography.

The Liquefaction of Hydrogen.—The strenuous efforts now being made by physicists, notably Professor Dewar, to approach the zero of temperature are in some ways analogous to the numerous attempts that have been made, or are now being made, to reach the North Pole. An account of these efforts is given in the *Times* of September 1. The zero may be defined as that temperature at which gas particles would, theoretically, give no pressure and have no volume. The temperature at which this would take



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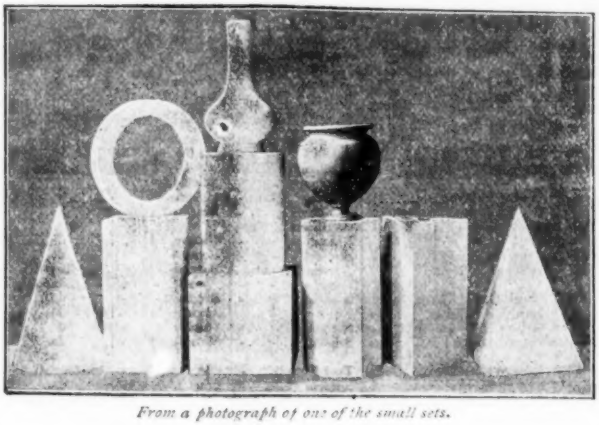

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place is 274 degrees below the freezing point of water. The only avenue of approach to this degree seems to be the liquefaction of hydrogen, which is the sole remaining gas that has not been liquefied. It is true most text-books state the reverse, on the ground that it has been proved that compressed hydrogen when expanded can yield a mist. Such statements, however, are misleading, for hydrogen has not been liquefied.

The possibility of making a gas pass into the liquid state depends upon the possibility below the point of temperature known as the critical point. Unless this point is reached no amount of pressure can force the gas into the liquid condition. Now, hydrogen has a critical point of about minus 240 degrees, and the question is, How can we attain such a temperature, seeing that liquid air or nitrogen only enables a temperature of minus 200 degrees to be reached? How can these 40 degrees or 50 degrees, as the case may be, be bridged over? This can only be done by constructing a new substance, having a critical point of minus 200 degrees, or some 50 degrees lower than nitrogen, which is the most volatile known liquid. Such a body can be made by liquefying a gas composed of hydrogen mixed with 10 per cent. of nitrogen. This is the direction in which Professor Dewar has been lately pressing forward his investigations, and the results he has obtained give hopes of further advances. He has found that when such a mixture is subjected to high compression at a temperature of minus 200 C., and the resulting liquid is expanded into air, a much lower temperature than anything that has been recorded up to the present time can be reached. This is proved by the fact that such a mixed gas gives under these conditions a paste or jelly of solid nitrogen, evidently giving off hydrogen, because the gas coming off burns fiercely. Even when hydrogen containing only some 2 to 5 per cent. of air is similarly treated, the result is a white solid material (solid air) along with a clear liquid of low density which is so exceedingly volatile that no known device for collecting it has been successful. To attain such a result it is necessary to liquefy and expand more than one pound weight (or about seven cubic yards) of hydrogen gas. Knowing the difficulties from having to deal in the liquid state with the accumulated small impurities in such large amounts of gas, Professor Dewar will not declare that he has had pure liquid hydrogen in one of his vacuum vessels, although what this liquid can be except hydrogen it is impossible to say.

SCHOLARSHIPS AWARDED BY THE DEPARTMENT OF SCIENCE AND ART.

It is surprising how few students have a clear understanding with regard to the scholarships and exhibitions awarded in competition at the annual May examinations of the Department of Science and Art. So many letters have been received at various times asking for information upon these awards that a brief description of them should be useful to a large number of our readers.

There are awarded every year (1) four Royal Exhibitions to the Royal College of Science, London; (2) three Royal Exhibitions to the Royal College of Science, Dublin; (3) twenty-two National Scholarships, tenable at the option of the holder; (4) six Free Studentships to the Royal College of Science, London.

No candidate can obtain more than one of these three classes of scholarships, viz., Royal Exhibitions, National Scholarships, Free Studentships. The values of the scholarships are thus set down in the Science and Art Directory:—

A Royal Exhibition entitles the holder to free admission to lectures and laboratories and to instruction during the course for the Associateship—about three years—in the Royal College of Science, London, or the Royal College of Science, Dublin, with a maintenance allowance of £50 a year.

A National Scholarship entitles the holder to free admission to lectures and laboratories and to instruction during the course for the Associateship—about three years—at either the Royal College of Science, London, or the Royal College of Science, Dublin, at the option of the holder, with a maintenance allowance of 30s. a week for the session of about forty weeks each year, and third-class railway fare for one journey to and fro, each session, between the home of the scholar and London or Dublin, as the case may be.

A Free Studentship entitles the holder to free admission to the lectures and laboratories and to instruction during the course for the Associateship—about three years—in the Royal College of Science, London, but not to any maintenance or travelling allowance.

The Royal Exhibitions and Free Studentships are open to all British subjects. The National Scholarships, however, are only open to students on account of whose instruction payments on results can be claimed. Under ordinary circumstances, any teacher in an elementary school is eligible.

In order that our readers may see what is required in order to gain a scholarship, we give a list of this year's awards, together with a statement of the results obtained by the highest and lowest successful candidates. For this information we are indebted to the Department of Science and Art.

LIST OF SUCCESSFUL CANDIDATES FOR ROYAL EXHIBITIONS, NATIONAL SCHOLARSHIPS, AND FREE STUDENTSHIPS (SCIENCE), 1894.

Name.	Age.	Occupation.	Place.	Award.
Arthur H. Barker	23	Fitter	Pontefract	National Scholarships for Mechanics.
Edward R. Amor	18	Engineer Apprentice	Devonport	
John T. Rieley	25	Science Teacher	Birmingham	
Charles B. Brodigan	24	Draughtsman	London	
Charles A. West	24	Teacher	Tottenham, Middlesex	National Scholarships for Chemistry and Physics.
William H. White	15	Student	Ipswich	
Harry Dean	17	Student	Manchester	
William C. Reynolds	24	Pharmacist	London	
John Lister	18	Student	Stockport	
Ernest Smith	25	Assistant Teacher	Huddersfield	National Scholarships for Biological subjects.
Frank H. Probert	17	Student	London	
Frank Fisher	19	Engineer	Brighton	Royal Exhibition.
George M. Russell	22	Shipwright Apprentice	Portsmouth	
Samuel Stansfield	21	Engineering Student	Todmorden	National Scholarship.
Gilbert T. Morgan	23	Chemist	Huddersfield	do.
William G. Hall	18	Student	Nottingham	do.
Arthur S. Cox	17	Student	Southampton	do.
Clarence Smith	18	Student	Brighton	do.
Frederick T. Munton	25	Joiner	Derby	Royal Exhibition.
George Wilson	22	Mechanical Engineer	Sheffield	National Scholarship.
George E. Ashforth	16	Student	Manchester	do.
George L. Overton	19	Watchmaker	Bradford, Yorks	do.
Norton Baron	21	Engineering Student	Ulceby, Lincs.	do.
Ernest E. L. Dixon	18	Student	London	do.
William H. Eccles	18	Apprentice Druggist	Barrow-in-Furness	Royal Exhibition.
Frank G. Edmed	17	Student	Brighton	do.
Henry T. Hildage	19	Fitter	Altrincham	do.
Robert H. Watson	24	Student	Dublin	do.
Harold Hibbert	16	Student	Manchester	do.
John W. Button	23	Tool Fitter	Oldham	Free Studentship.
George H. Stanley	17	Student	London	do.
Walter Eraut	19	Mech. Engineer's Apprentice	London	do.
William I. Chubb	23	Draughtsman	London	do.
Robert H. H. Duncan	15	Student	Sunderland	do.
George George	18	Student	Bristol	do.

Percy Nicholls, 23, Engineer, of Pontefract, obtained the 3rd place in order of merit in the competition for National Scholarships, etc., but withdrew before the awards were actually made.

In the Competition for Royal Exhibitions, National Scholarships, and Free Studentships the total number of Candidates was 180.

The Results obtained by the highest and lowest successful candidates are as follows, viz.:—

(I.) ROYAL EXHIBITIONS.

Highest.

Honours	2nd class in 4 subjects. Failed in 2 subjects.
Advanced Stage	1st class in 4 subjects. and ,, 2 ,,
Mathematics	2nd class honours in stages 1, 2 and 3. 2nd class in stage 5. 2nd ,, 6.

Lowest.

Honours	1st class in 1 subject. Failed in 2 subjects.
Advanced Stage	1st class in 2 subjects. 2nd ,, 6 ,, Failed in 3 subjects.
Elementary Stage	Pass in 2 subjects. Failed in 1 subject.
Mathematics	Failed in stage 3. (Had previously qualified in this subject.)

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Und geht an die Quelle.
Et se rend à la fontaine.
καὶ ὑπάγει εἰς τὴν πηγήν.

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CLASSES for the study of Literature (English and Foreign) and the Art of Literary Composition and Style will be commenced in October.

The following Course of Lectures will be given on Wednesdays, at 7.30 p.m., commencing October 4th, 1894:—

By HOWARD SWAN.

I. Mental Visualization and Literary Expression—Colloquial and Literary Language, Essentials and Differences.
II. Shakespeare's Sonnets, and the Art of Poetry as therein displayed.
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History and Geography.

A HISTORY and GEOGRAPHY COURSE will be begun on Sept. 17th for the connected teaching of ENGLISH HISTORY and GEOGRAPHY on the Imaginative and Comparative Method, by A. W. ANDREWS, B.A., Fell. Hist. Soc.

The principle in History will be to teach the pupils a series of clear mental pictures of the life of the people at each epoch, grouped around striking events or personalities, and compared with the present times. Special attention will be paid to Economic History, the growth of the navy and towns, and to the Literature, Geography, and all that bears on the life of the people.

CLASSES will be established for three kinds of students:—

I. ELEMENTARY HISTORY AND GEOGRAPHY.
For pupils desirous of commencing the study of History and Geography. *Mondays and Thursdays,* 3—5.

II. ADVANCED HISTORY AND GEOGRAPHY.
Lectures for more advanced students, dealing in History with Economic and Social development of the Past and Present, and the probable development of the Future; and in Geography with the larger aspects of Science and conquest of Nature. *Tuesdays and Fridays,* 3—5.

III. TEACHERS' COURSE.
A Course of Suggestion and actual Training for Teachers of History and Geography. *Wednesdays,* 5—7.

These Courses will begin in October.

Prospectus from Secretary post free.

(II.) NATIONAL SCHOLARSHIPS.

Highest.

Honours	1st class in 5 subjects. 2nd ,, 5 ,, Failed in 1 subject.
Advanced Stage	1st class in 1 subject.
Mathematics	1st class in stage 3. 1st ,, ,, 5. 2nd ,, ,, 6.

Lowest.

Advanced Stage	1st class in 2 subjects. 2nd ,, 5 ,, Failed in 1 subject.
Elementary Stage	Pass in 3 subjects. Failed in 1 subject.
Mathematics	2nd class in stage 2.

(III.) FREE STUDENTSHIPS.

Highest.

Honours	2nd class in 1 subject.
Advanced Stage	1st class in 8 subjects. 2nd ,, 1 subject.
Mathematics	1st class in stage 3. 2nd ,, ,, 5.

Lowest.

Honours	2nd class in 1 subject. Failed in 5 subjects.
Advanced Stage	1st class in 2 subjects. 2nd ,, 2 ,, Failed in 1 subject.
Elementary Stage	Pass in 1 subject. Failed in 1 subject.
Mathematics	2nd class in stage 3. 2nd ,, ,, 4.

It will be seen that an immense amount of work is required in order to be successful, and a teacher should carefully consider before undertaking it. We know several cases in which assistants in elementary schools have gained scholarships and passed creditably through the Royal College of Science, South Kensington, yet at the end they found themselves worse off than when they entered the College. One reason for this is that the College authorities do little for the men they are supposed to train. Very few educational institutions ask them to recommend men for vacant posts; in fact, there is a lamentable absence of the interest which the heads of training colleges take in the future of their students. Thus it happens that teachers who have given up good appointments in order to go through the College of Science often find themselves adrift at the end of three years. Many Boards and Committees of Elementary Schools consider that such teachers have got out of touch with the work, and fight shy of them accordingly. If a teacher, however, is enamoured of sciences, and wishes to devote himself entirely to science teaching or scientific research, then the best thing he can do is to work his way to one of the scholarships described in the foregoing. Any assistance that the Editor can render to such a student will be cheerfully given.

SOLUTIONS TO QUESTIONS IN THEORETICAL MECHANICS.

BY F. CASTLE, M.I.M.E.

SOLIDS.—Elementary Stage.

1. (*a*) Define constant (or uniform) acceleration.

A point moves with constant acceleration when equal changes of velocity take place in equal intervals of time, however small these times may be.

(*b*) A particle moves in a straight line, and for any second of its motion the velocity at the end of the second is 6 ft. a second greater than the velocity at the beginning of the second; what is the acceleration of the velocity?

The acceleration is 6 ft. per second, per second.

(*c*) What inference can be drawn as to the force which acts on the particle.

The force acting on the body is constant.

2. (*a*) A piece of lead weighs 3 lbs. 12 ozs., and a piece of oak weighs 2 lbs. 8 ozs.; what ratio does the mass of the piece of lead bear to the mass of the piece of oak?

The mass of a body is proportional to its weight, this can be easily verified by using the equation $W = Mg$. Thus let W_1 and W_2 be the weights of two bodies, M_1 and M_2 their masses. Then as the acceleration are the same and equal to g, we have

$$W_1 = M_1 g$$
$$W_2 = M_2 g$$
$$\therefore M_1 : M_2 :: W_1 : W_2$$

3lbs. 12 ozs. = 60 ozs., and 2 lbs. 8 ozs. = 40 ozs.

$$\therefore \frac{\text{Mass of lead}}{\text{Mass of oak}} = \frac{60}{40} = \frac{3}{2}.$$

(*b*) Would it make any difference in the answer if it were a piece of copper that weighed 3 lbs. 12 ozs., and a piece of deal that weighed 2 lbs. 8 ozs.?

No; the ratio of mass of copper to mass of deal would be exactly the same.

(*c*) If the piece of lead is moving at the rate of 500 yds. a minute, and the piece of oak at the rate of 30 ft. a second, what ratio does the momentum of the lead bear to that of the oak?

500 yards per minute is equal to 25 ft. per sec.

$$\therefore \frac{\text{Momentum of lead}}{\text{Momentum of oak}} = \frac{60 \times 25}{40 \times 30} = \frac{5}{4}.$$

3. (*a*) Define the moment of a force with respect to a given point.

The moment of a force with respect to a given point is the product of the force and the perpendicular distance from the line of action of the force to the given point.

(*b*) Two forces act in the same plane, and a point is taken anywhere in the plane; what relation exists between the moments of those forces with respect to the point, and the moment of their resultant with respect to the point?

The algebraical sum of the moments of the two given forces about the point, is equal to the moment of their resultant about the same point.

(*c*) What is meant by the algebraical sum of two numbers?

When the algebraical signs of positive and negative directions are applied to numbers, and those of like signs are added together, the difference between these two numbers with the sign of the greater prefixed is called the algebraical sum.

(*d*) Find the algebraical sum of $+12$ and -15.

Sum of $+12 - 15 = -3$.

4. (*a*) A, B, C, D are the angular points taken in order of a square; produce AD to E, making AE equal to 2 AD; suppose a force of 10 units acts from B to A, and a force of 20 units from B to C; find the moment of their resultant about D; also about A and about E.

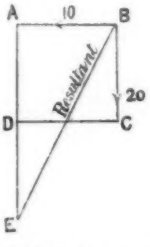
Let x = length of side of the square.

The resultant R = BE.

Then moment of R about D $= -20x + 10x$.
$= -10x$.

,, ,, ,, A $= 10 \times 0 - 20 \times x$.
$= -20x$.

,, ,, ,, E $= 10 \times 2x - 20x$.
$= 0$.



(*b*) Along what line does the resultant act?

The resultant acts along the line BE.

Note.—The direction of motion of the hands of a clock is taken as negative.

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5. (*a*) Define a horse-power.

A horse-power is equal to 33,000 ft. lbs. of work per minute.

(*b*) A fall is 11 ft. high, and 450,000 gallons of water go down it per hour; compare the power of the fall with that of a steam engine working with 8 horse-power. (A gallon of water weighs 10 lbs.)

Work done by the water per min.

$$= \frac{11 \times 450{,}000 \times 10}{60} \text{ ft. lbs.}$$

$$= 11 \times 75{,}000 \text{ ft. lbs.}$$

Work done by steam engine per min.

$$= 8 \times 33{,}000 \text{ ft. lbs.}$$

$$\text{Ratio required} = \frac{11 \times 75{,}000}{8 \times 33{,}000} = \frac{25}{8}.$$

6. (*a*) AB is a rod of uniform cross section 12 ft. long, it is made up of two rods of equal length, AC and CB, firmly joined at C; they are of different materials, so that AC weighs 3 lbs., and CB weighs 2 lbs.; find the distance from A to the centre of gravity of the rod.

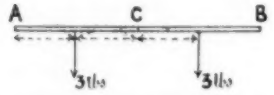
Let x = distance from A to the centre of gravity.

Taking moments about A.

$$x \times 5 = 3 \times 3 + 2 \times 9 = 27.$$

$$\therefore x = 5\tfrac{2}{5} \text{ ft.}$$

$\therefore$ Centre of gravity is $5\frac{2}{5}$ ft. from the end A.



(*b*) Find also what weight must be placed at B that the centre of gravity of the whole may be at C.

Let w = weight required.

Taking moments about C we have $w \times 6 + 2 \times 3 = 3 \times 3$.

$$\therefore w = \tfrac{1}{2} \text{ lb.}$$

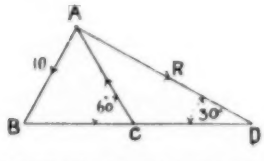
Hence $\frac{1}{2}$ lb. must be placed at B so that centre of gravity may be at C.

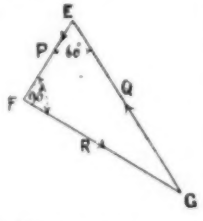
7. (*a*) Draw an equilateral triangle ABC, and produce BC to D, making CD equal to BC; suppose that BD is a rod (without weight) kept at rest by forces acting along the lines AB, AC, AD; given that the force acting at B is one of 10 units acting from A to B, find by construction (or otherwise) the other two forces, and specify them completely.

At the point A three forces keep equilibrium, draw the triangle of forces EFG, draw EF parallel to AB and equal 10 units to represent the given force in direction and magnitude, and the triangle is completed by taking EG parallel to AC, and FG parallel to AD, then FG represents the magnitude and direction of the force in AD, similarly GE gives magnitude and direction of the force in AC to the same scale on which EF = 10 units;

or $P = EF = 10$ lbs. $R = FG = 10 \cot 30° = 10\sqrt{3} = 17{\cdot}32$ lbs.

$Q = GE = 10 \operatorname{cosec} 30° = 10 \times 2 = 20$ lbs.





(*b*) Mention the points that go to the specification of a force.

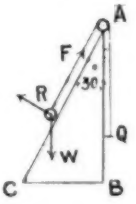
The points necessary are (1) the direction, (2) the point of application, (3) the magnitude.

The magnitudes and directions of the above forces have already been determined, and A is a common point of application.

8. (*a*) Draw a vertical line AB, A above B, and draw AC making an angle of 30° with AB; let AC represent an inclined plane, and let a particle (P) placed on it be supported by a thread which passes over A, and is tied to a fixed point (Q) in AB; show in a diagram the forces which keep P at rest.

The forces which keep P at rest are shown on the diagram, and are—

(1) The tension in the string F.
(2) The reaction of the plane R.
(3) The weight of the body W.



(*b*) If P weighs 20 lbs., find, by construction or otherwise, the forces which support P.

If $W = 20$ lbs., $R = W \sin 30° = 20 \times \frac{1}{2} = 10$ lbs.

$$F = 20 \cos 30° = 20 \times \frac{\sqrt{3}}{2} = 17{\cdot}32 \text{ lbs.}$$

(*c*) Find also the pull on the fixed point Q.

Pull on fixed point Q = tension in string = 17·32 lbs.

(*d*) And the pressure on the top of the plane at A.

The pressure on A is the resultant of two equal forces, each equal to 17·32 lbs., acting at an angle of 30°, the resultant R^1 can be found by completing the parallelogram, or by calculation.

$$R^1 = \sqrt{(10\sqrt{3})^2 + (10\sqrt{3})^2 - 2 \times 10\sqrt{3} \times 10\sqrt{3} \cos 150°}$$

$$= \sqrt{600 + \frac{600\sqrt{3}}{2}}$$

$$= \underline{33{\cdot}5 \text{ lbs.}}$$

9. (*a*) A lever can turn freely round a fixed point or hinge, and is kept at rest by two forces (in addition to the reaction of the fixed point); state what is the relation that exists between these two forces.

The moments of the two forces about the fixed point are equal in amount, but opposite in direction.

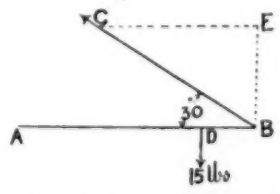
(*b*) Draw a horizontal line AB, and a line BC, making an angle of 30° with it, C being above A; suppose that AB represents a lever without weight, that can turn freely round a hinge at A; a weight of 15 lbs. is hung from a point D on the lever, AD being three-quarters of AB; find, by construction or otherwise, the force acting along BC which will support the weight.

Let F denote the force acting along BC; the vertical component of this force is shown in the diagram by the line BE. Since the angle $CBA = 30°$, the angle $CBE = 60°$; hence $BE = F \cos 60° = F \times \frac{1}{2}$.

Then taking moments about A,

$$\frac{F}{2} \times AB = 15 \times \tfrac{3}{4} AB;$$

$$\therefore F = \frac{15 \times 3 \times 2}{4} = 22\tfrac{1}{2} \text{ lbs.}$$



(*c*) Specify completely the force, when you have determined it.

The direction of force is along the line BC, from B towards C.

The magnitude of force is $22\frac{1}{2}$ lbs.

The point of application is B.

(*To be continued.*)

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Wisdom is humble that he knows no more.'—COWPER.

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'ARE WE BETTER OR WORSE THAN WE USED TO BE—AND BY HOW MUCH?'

A HUMOROUS DEBATE FOR BOYS.

BY JOSEPH DESPICHT.

Author of Prize Play, 'In 1999,' 'Should Men wear Hats?' etc.

(*Time in performance, 30 mins.*)

N.B.—This debate is taken, for the sake of variety, out of the House of Commons; but the former procedure can easily be adapted to it. See directions to 'Should Men Wear Hats?'

(On the rising of the curtain, the young folks taking part in the debate are discovered seated in the form of a V, with the Chairman's table and chair at the apex.)

1ST SPEAKER, R*.

Members of the '—— (mentioning name of school) Universal Debating Society,' please put down your papers, and let us proceed to the business of the evening. (Hear, hear! All assume an attentive attitude.)

A story is told of three Englishmen, who, wrecked upon a desert island, felt it their duty to elect a chairman before they decided to dine. (Laughter.) Now, I propose we imitate the example of those fastidious gentlemen, and forthwith elect a chairman. (Hear, hear!) I beg to move that —— (mentioning a name) be our president this evening;—(Hear, hear!)—and, in doing so, I will simply add that his good taste, tact, and impartiality, are well known to us all;—(Hear, hear!)—while his intimate acquaintance with everything ancient or modern cannot but facilitate the progress of the impending important debate. (Loud cheers.)

2ND SPEAKER, R.

I have much pleasure in seconding that. (Cries of 'Agreed!' 'Hear, hear!' during which the elected chairman puts on wig and gown, and ascends the chair. Loud cheers.)

CHAIRMAN.

Gentlemen, I cannot but feel somewhat overwhelmed by the honour you do me in placing me in the chair, and I can only accept the distinction on the ground that I shall probably be of more use in maintaining order than—owing to the superior talking powers of those around me—I should be in debate. (No, no! and laughter.) I have one other inducement to accept your invitation, and that is, the exceedingly kind manner in which you have received the proposition of my friend on the right. (Cheers.)

Before I call upon the opener to commence the debate, let me, for the sake of new members present, read over the rules of this 'Universal Debating Society.' (Hear, hear!)

(i) The Chair may be addressed in any living language, but never in a dead one. (Hear, hear!)

(ii) No reference whatever, for the purpose of influencing votes, may be made to speeches delivered elsewhere. (Hear, hear!)

(iii) He speaks first who first catches the Chairman's eye. (Hear, hear!)

(iv) He speaks not at all who speaks not aloud. (Hear, hear!)

(v) He speaks not at all who speaks hat on head. (Hear, hear!)

(vi) When the Chairman puts on his tall black hat all business *de facto* ceases. (Hear, hear!)

The question which we debate this evening is—'Are we better or worse than we used to be—and by how much?' In the hope, then, that this important question will be discussed with all the gravity and decorum due to it, I leave the matter in your hands, and call upon the opener to submit his proposition. (Cheers.)

1ST SPEAKER, R. (Renewed cheers.)

Mr. Chairman and enlightened members of the '—— Universal Debating Society,' I am not fond of glowing exordiums, or stilted perorations; and, therefore, divesting my case of all mere verbiage, I at once lay down for your acceptance or rejection this proposition—'That in the opinion of this Society we are *worse* than we used to be, and by a *very great deal*.' (Hear, hear! and No, no!)

I hear some *faint* cries of 'No, no!' but what I have declared to be true, I am prepared to prove. (Hear, hear! on Right.) And when I say '*we*' are worse than we used to be, I use the word in its widest sense, and mean to assert that the world at large has greatly deteriorated since the days of old. (Hear, hear! No, no!) Look at the painters of former times—Michael Angelo and Raphael. Have we any now competent even to mix their paint? (No, no! on Right.)

Take orators too. Where shall we look for our Demosthenes? our Cato? Is there a modern Mark Antony? (No, no!) On the battlefield of to-day is there an Alexander, or a Hannibal? (No, no!)

And I do not confine myself to the male sex, much as I should like to. (Oh, oh! and Hear, hear!) Where is now a Boadicea, or even a Joan of Arc? (Hear, hear!)

Among rulers of men can we produce such giants as Julius Cæsar, and Caius Marcius Coriolanus? (No, no!)

And what has poetry to show in this miserable Nineteenth Century to compare with the immortal works of Homer and Virgil, Shakespeare and Milton? (Nothing!)

The moral view of the case I leave to my first lieutenant, and content myself with declaring that never again can the ancient glories be revived. They are dead—dead as a door-nail. And I maintain that morally, physically, and intellectually, we are *much worse* than our forefathers were. (Hear, hear! No, no! Order! Chair! Chairman rings bell.)

2ND SPEAKER, R.

Mr. President, gentlemen, and I wish I might add ladies. (Hear, hear!) I conceive that my leader has so proved his case to complete demonstration, that the conviction must have already come home to our opponents that we are—or at least some of us are—particles of a puny and insignificant race compared with our magnificent forefathers. (Hear, hear! No, no!)

* 'R' and 'L' signify 'Right' or 'Left of Speaker.

But just one word from the *moral* point of view. When shall we again see anything to equal the self-denial of Diogenes, who was content to live in a tub? (Hear, hear!) When shall we see duplicated the piety of the ancient monks—Francis of Agassis, for example—(Hear, hear!)—the splendid patriotism of the Roman citizen—(Hear, hear!)—or the magnificent unselfishness of the Spartan mothers, who, themselves, sent forth their sons to battle, and gave them up from the age of seven entirely to the service of the State? (Loud cheers.)

Yes, sir, *sic transit gloria* old *mundi*—and if there should be still found one here or there vastly superior to the rest—ahem!—the exception only proves the rule, that you fellows of the period are undoubtedly, and irredeemably, *a hopelessly bad lot.* (Hear, hear! No, no!)

3RD SPEAKER, L.

Sir, I really must protest against the unwarrantable assumption of the last, and, may I say, *ex*tinguished speaker, that we have all been converted to his and his party's way of thinking. (Hear, hear! on Left.) For, for my own part, the opener's arguments have convinced me, and re-convinced me, that *he* is wrong, and his opponents right. (Hear, hear! and Oh, oh!) I came to this debate with a mind absolutely open on this subject, not knowing, as usual, upon which side I should vote. (Oh, oh! on Right.) But the speakers opposite have made the task of coming to a decision extremely easy. (Hear, hear!) For what have they really proved? Why, that during all the centuries preceding the Nineteenth, there have been produced *two* great painters—(Hear, hear! on Left)—*two* great lawgivers—(Hear, hear!)—*two* great soldiers—(Hear, hear!)—*four* poets—(Hear, hear!)—a queen who was mad enough to poison herself—(Laughter)—and an old man who was stupid enough to live in a beer-barrel. (Hear, hear! and loud laughter.)

Now, if it can be proved—and I leave this part of our task to some more useful tongue—(Takes a sip of water)—I say, if it can be proved, that this poor despised Nineteenth Century has given to the world even *one* example of a great painter, *one* great statesman, *one* eminent soldier, *one* real poet, and *no* suicidal queens, or tub-haunting old men, why then it follows that the glorious march of civilisation has not been checked; that progress still goes on, as it ever shall; and that, in fact, far from being worse, we are, though not altogether by our own exertions, a great deal *better* than we used to be. (Hear, hear! No, no! Bell.)

4TH SPEAKER, R.

Mr. Chairman, it shall be my object to bring this debate out of the heated atmosphere of violence and exaggeration, and restore it to the calm region of reason and moderation appropriate to the subject under consideration. (Hear, hear! on Right.)

Now my friend the opener, in laying down his premises, and citing his examples, did not for a moment pretend to exhaust the list of illustrious names amongst the ancients, but was content to give, as examples of the rest, a few of the more notable ones; and, therefore, the answer of the gentleman opposite falls entirely to the ground. (Hear, hear! No, no!)

And his pleasantry at the expense of the fame of an illustrious though misguided queen, and his thinly veiled sneer at the name of a philosopher whom all the world—except the iconoclasts opposite—delights to honour, were entirely out of place, and out of taste. (Hear, hear! No, no! Bell.) The opener, if he had wished, might have added the mighty names of Plato and Socrates—(Hear, hear! on Right)—Aristotle and Æsculapius—(Hear, hear!)—Artaxerxes and Aristophanes—(Hear, hear!)—Dante and Petrarch—(Hear, hear!)—Bede and Chaucer—(Hear, hear!)—and so on, for longer than I care to try your patience. Yes, indeed, my friends, there is a terrible falling off in the human species, which I, for one, cannot too much deplore. (Hear, hear! No, no! Chair!)

5TH SPEAKER, L.

Mr. Chairman, there is no one whom, personally, I esteem more highly than the learned member who has just resumed his seat, and I should be the last in the world to say anything that would cause him pain. (Hear, hear!) But justice compels me to remark, that since he became enamoured of those ancient 'beauties,' he has evidently been afflicted with that mental disease which for want of a better name has been designated 'Antiquity on the brain.' (Hear, hear! on Left.) We are all familiar with the instrument called the telescope, and we know, too, that anything seen through it presents a vastly different appearance from that which it bears on closer inspection. (Hear, hear!) For example, an old ruin, miles away, seen through its glasses, may be, and often is, a very picturesque sight, and, certainly, its minute imperfections will pass unnoticed. (Hear, hear!) But put the telescope down and place yourself *inside* the ruin itself, and the illusion disappears. You see nothing but toppling walls and tipsy-looking chimney-stacks, together with a heap of indescribable rubbish. (Hear, hear!) So it is with our antediluvian friend opposite. He sees antiquity through the telescope of centuries, and he exclaims, 'How perfect! How lovely! How, too, too, thrillingly æsthetic!'

But I venture to say, that had he lived in those mouldy old times, his tune would have been 'How terribly hideous!' (Laughter. Hear, hear! No, no! Bell.)

6TH SPEAKER, L.

Mr. Chairman, I am about to advise my friends on this side to give up the point, and bow their insignificant heads beneath the weight of our opponents' accumulated, and still accumulating, arguments.

For, who can deny that the name of Artaxerxes is greater than the name of Bright? Why, it has *more letters* in it! (Hear, hear! on Left, and laughter.)

Compare Caius Marcius Coriolanus with Smith. Why, it's four times as great! (Hear, hear!) And who shall dare to say that Themistocles, Alcibiades, and Aristophanes, do not sound vastly superior to Box, and Cox, and Fox? (Hear, hear!) Then put Diogenes, Euryptolemus, and Æsculapius at the side of Dickens, Howitt, Burns, and you will see how justly the extinct volcanoes on the opposite benches claim the victory! (Hear, hear!) For, if those old-world fossils had nothing else, they certainly had *very good names!* (Cheers and laughter.)

7TH SPEAKER, R.

Sir, I am sure it is with mingled feelings of horror and contempt that we have heard the sarcastic remarks of the last speaker. (Hear, hear! on Right.)

As Lord Tomnoddy has so well and truly said in another place—(Oh! oh! Order! Chair!)

8TH SPEAKER, L. (with Irish brogue).

Mr. Spaker, I roise to order! (Hear, hear!) Is a member of this Socoiety permitted to quote what has been said in the House of Pares?

MR. CHAIRMAN.

The honourable and learned member is certainly out of order. (Hear, hear!)

7TH SPEAKER.

Sir, I submit to your ruling. I was only about to remark, when the hot-headed young gentleman opposite interrupted me——(Order! order!)

8TH SPEAKER.

Mr. Spaker—I mean Sorr, I again roise to order. (Hear, hear! on Left.) The myrmidon of the party opposite has referrèd to me as a hot-headed young gintleman! Now, I am considerably more than *siven*, and therefore the epithet 'young' is entoirely objectionable! (Hear, hear!)

MR. CHAIRMAN.

The honourable and learned member must certainly withdraw the unparliamentary expression—and take warning! (Hear, hear! and ironical cheers.)

7TH SPEAKER.

Sir, I again submit to your ruling, and withdraw the expression 'young.' I was, I say, simply reminding gentlemen opposite that even such a great authority as Lord Tomnoddy——(Shame! Order! Chair!)

8TH SPEAKER.

Mr. Spaker—I mean Mr. Chairman, the member is again referring to spaches made in the House of Pares.

MR. CHAIRMAN.

I have already ruled such conduct out of order. (Hear, hear!)

8TH SPEAKER.

Sorr, the last spaker has been ruled three toimes out of order, which amounts, I belave, by our rules of procadure, to wilful and flagrant obstruction. I beg, therefore, to move that he be heard no more this sassion—I mane this noight! (Hear, hear!)

3RD SPEAKER, L.

I beg to second that.

MR. CHAIRMAN.

It is proposed and seconded that Mr. —— (mentioning 7th Speaker's name) be heard no more this evening. Those who agree signify the same in the usual manner. (Many cry 'Aye!') On the contrary—(a few feebly cry 'No!') The 'Ayes' have it, and I must ask the member named to go home to his mother. (Bravo! Shame! Seventh speaker leaves platform shaking his fist at the Left. Mr. Chairman says, 'I call upon Mr. N—— to continue the debate.')

9TH SPEAKER, R.

Mr. President, it is pitiable to observe to what tricks and subterfuges the opposers of this motion are reduced, by their entire lack of broad and solid argument (Hear, hear! and Oh, oh!); for, I appeal to any candid gentleman upon the opposite benches—if such a one can be found—to tell me whether one word of sound common sense has been uttered in that quarter, that can in any way shake the position taken up by the opener? (Cheers, and Oh, oh!)

Let me recall to the minds of the opposite party the broad features of our case, for they seem in some danger of actually forgetting what we are really talking about! (Hear, hear! on Right.)

Now, we say, that the world in general is a great deal *worse* than it used to be! (Hear, hear! No, no!) And, as a proof of that, let me contrast the public records of former times with those of the present day! In the first we read only of acts of valour and chivalry—imprisoned maidens rescued by gallant and irreproachable knights—mighty deeds on the tented field—heroism in all its ancient, picturesque variety—and the dialogues of philosophers who were indeed worthy of the name. (Hear, hear!) But what have we now? Take up any newspaper and read for yourselves! Murders, incendiarism, forgery, perjury, petty larceny, and wife-beating! (Hear, hear!)

Yes! lamentable as the confession is, it must be admitted by assentient and dissentient alike, that with all our boasted civilisation—with all our vaunted liberty—with all the multitudinous means at our command for the diffusion of knowledge—we are, nevertheless, morally, physically, and intellectually, *worse* than our fathers were! (No, no! Hear, hear! Several rise to speak—one is named.)

10TH SPEAKER (with slight Irish brogue).

Sir, I shall pass over, with the contempt it deserves, the remark made by the last speaker impeaching our candour. (Hear, hear!) And I at once take up his challenge to produce some solid argument proving that we are *not* worse than our ancestors. (Hear, hear!) And I think he cannot complain if I attack him on his own ground. (Hear, hear!)

Now, the deeds of valour and chivalry of the ancients have been mentioned. But I maintain that their valorous deeds were, nine times out of ten, acts of rapine and plunder. (Hear, hear! on Left.) Brutal *might* hacking and hewing at unprotected *right!* (Hear, hear!)

And their chivalry! For the most part it was merely ridiculous tilting at windmills, vanquishing fleecy flocks of sheep, (Hear, hear!) or, more likely still, it was all *fiction!* (Hear, hear! No, no!) For my own part, I do not believe that your poor persecuted princess was ever incarcerated in your ruthless monster's deepest, dampest dungeon since the year one—for the men have always been only too glad to keep the ladies with them! (Hear, hear! on both sides.)

Then the murders! Are such things entirely *modern?* Pray how did Cæsar die? By the daggers of assassins! (Hear, hear!) What manner of death did your Caius Marcius Coriolanus meet? He fell, pierced by the swords of men he had fought for—not one present at the time lifting a hand to defend him! (Hear, hear!) And, later on, who killed the Princes in the Tower? Why, their uncle, Richard Crookback! (Hear, hear!) And as to wife-beating, every well-read schoolboy knows that William the Conqueror gave *his* lady-love a good *horse-whipping!* (Hear, hear! and laughter.)

And the Spartan women. (Hear, hear! on Right.) Oh, yes! don't let me forget them! The gentleman—a married man, I believe—who referred to them, forgot to mention the little fact that these noble, self-denying creatures, used to thrash the bachelors round and round the altars to compel them to marry! (Laughter.)

But, pleasantry aside, the real answer to the last speaker is this: In the ancient records we read chiefly of the doings of the distinguished *few;* whereas, in the penny paper of to-day we have related the acts of the *million!* (Hear, hear! Bravo! Bell, etc.)

(To be concluded in our next.)

WELL-KNOWN TEACHERS AT WORK.

XXXIII.—MR. F. TURNER,

Head Master, New Mill National School, Huddersfield.

THOSE who are at all acquainted with the history of Education in West Yorkshire, or with the efforts in the direction of educational improvement and reform that are now being made in that locality, will at once concede that we have placed before our readers on this occasion one who has earned a considerable reputation, and one whom his fellows delight to honour. The National School at New Mill is not an enormous palatial palace replete with the most elaborate school necessities, but it is an educational establishment wherein the children of the surrounding neighbourhood may obtain such an amount of knowledge as this age of Codes and Regulations will allow, and where the methods of instruction are such as might well be imitated in far more pretentious places.

Mr. F. Turner commenced his scholastic career as a Pupil Teacher at the National School, Barnack, near Stamford. Here he was under the supervision of the late Dean of Peterboro', Dr. Argles. Our conversation about this period of Mr. Turner's life was full of interest. The father of Kingsley was Rector of Barnack prior to removing to Clovelly, and here it was that the great author and teacher spent a part of his boyhood.

The Master of this village school at Barnack, Mr. Whitman, was brought from the college at Battersea at a time when a determined effort was successfully made to place the school upon a level with its most efficient competitors. To this gentleman Mr. Turner is indebted for a careful training, and also for the inception of his love for the Union and its work.

From this school Mr. Turner proceeded to the Training College at Battersea, where he was resident during 1871–2. At this period the present Principals of Whitelands and Culham were on the Battersea staff.

Leaving college, Mr. Turner took charge of the National School at Shelley, near Huddersfield. Here he spent two years and produced excellent work. From Shelley Mr. Turner betook himself to his own neighbourhood once more, accepting the supervision of the National School at Eye, near Peterboro'. After a time he left to take the Board School at Higham Ferrers, on the Nen. Here he accomplished much useful work. The town of Higham Ferrers is one of the few existing 'close' boroughs, having a corporate governing body, the members of which are the happy possessors of absolute security of tenure. The Town Council fill up the vacancies caused by the death of any of their colleagues. This borough was at one time represented in Parliament by Edmund Burke, and its last member was Earl Grey. It was formerly a 'pocket' borough of the Fitzwilliams, who leased the estate from the Duchy of Lancaster. Higham Ferrers is the reputed burial place of John of Gaunt.

Mr. Turner's success in Yorkshire was, however, not to be forgotten, and eight years after leaving the National School at Shelley, he was asked to once more take the charge of the school which had been rebuilt. He did so, and returned to the West Riding. His labours at Shelley earned for him a more than local fame. Mr. Blakiston, the Chief Inspector of the division, regarded the school at Shelley as a 'model village school.'

For some time Mr. Turner laboured at Shelley, and about nine years ago he migrated to the neighbouring village of New Mill, where he is at present engaged. A thoroughly loyal and devoted Churchman, he resents any attempt to destroy the fabric of the Voluntary School System. His work in connection with his Church does not in the slightest degree partake of the nature of compulsory extraneous duty, and he is a striking example of the Christian

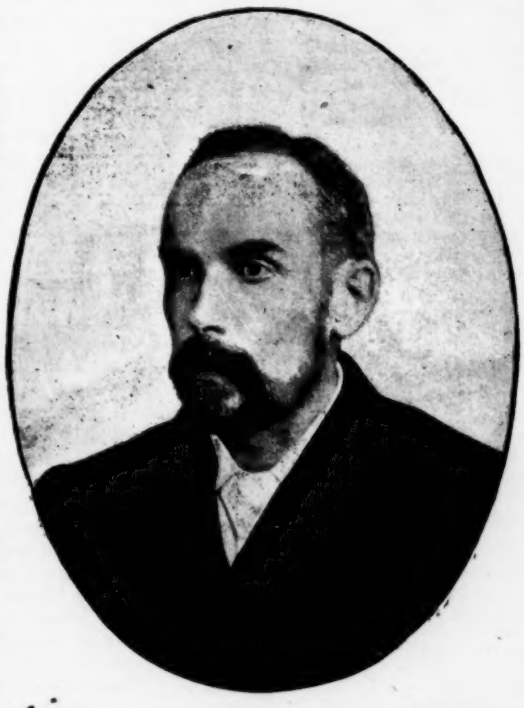
NEW MILL NATIONAL SCHOOL.—TIME TABLE.

MORNING.							DAY.	AFTERNOON.							
Standard.	9—9.35.	9.35—9.45.	9.45—10.30.	10.30—11.	11—11.15.	11.15—12.		1.30—1.40.	1.40—2.30.	2.30—3.	3—3.15.	3.15—3.50.	3.50—4.20.	4.20—4.30.
I.	Prayers and Hymn, followed by Religious Knowledge Lessons in all Classes.	Registers Marked. Closed at 9.45.	Writing	Recitation	Recreation or Drill. Reading of Stories and other Amusements in severe weather.	Drawing	MONDAY.	Registers Marked. Closed at 1.40.	Drawing for all the Boys, except Standard I. The Girls take Needlework.		Recreation or Drill. Stories read by Teachers, Pictures described, etc., in severe weather.	Geography	Arithmetic	Prayers. Hymn and Dismissal.
II.			Reading	Writing		Arithmetic						Geography	Arithmetic	
III.			Dictation	Reading		Arithmetic						Geography	Reading	
IV.			Dictation	Reading		Arithmetic						Reading	Geography	
V.–VII.			Reading	Composition		Arithmetic						Maps	Geography	
I.			Reading	Writing		Arithmetic	TUESDAY.		Arithmetic	Reading		Writing	History	
II.			Writing	History		Arithmetic			Arithmetic	Writing		Recitation	Reading	
III.			Reading	History		Arithmetic			Arithmetic	Reading		Recitation	Dictation	
IV.			Reading	History		Arithmetic			Arithmetic	Dictation		Recitation	Reading	
V.–VII.			Reading	History		Arithmetic			Arithmetic	Reading		Recitation	Composition	
I.			English	Writing		Arithmetic	WEDNESDAY.		Arithmetic	Reading		Writing	Drawing	
II.			Writing	Reading		Arithmetic			Arithmetic	English		Reading	Writing	
III.			Dictation	Reading		Arithmetic			Arithmetic	Reading		History	Dictation	
IV.			Dictation	Reading		Arithmetic			Arithmetic	Reading		History	Dictation	
V.–VII.			Reading	Composition		Arithmetic			Arithmetic	Reading		History	Composition	
I.			Writing	Reading		Arithmetic	THURSDAY.		Drawing for all the Boys, except Standard I. The Girls take Needlework.			Geography	Singing	
II.			Writing	Recitation		Arithmetic						Geography	Singing	
III.			Reading	Recitation		Arithmetic						Geography	Singing	
IV.			Reading	Copy Books		Arithmetic						Geography	Singing	
V.–VII.			Reading	Boys—Drawing Girls—Maps		Arithmetic						Geography	Singing	
I.			Geography	Reading		Arithmetic	FRIDAY.		Basket Weaving	Basket Weaving		Basket Weaving	Singing	
II.			Geography	Writing		Arithmetic			Basket Weaving	Basket Weaving		Basket Weaving	Singing	
III.			Geography	Writing		Arithmetic			Copy Books	Exercise Books		*Water Colouring	Singing	
IV.			Geography	Writing		Arithmetic			Exercise Books	*Water Colouring		Copy Books	Singing	
V.–VII.			Geography	Writing		Arithmetic			*Water Colouring	Copy Books		Exercise Books	Singing	

*Water Colouring—Boys, Geometrical Patterns; Girls, Floral Tracing.

teacher. He is the Lay Representative of his district on the Wakefield Diocesan Conference, he is a licensed Lay Reader, and well-known for his able theological expositions. He is the President of the Huddersfield and District Church Teachers' Association.

In politics, as may naturally be surmised, he is a Conservative, but our object in mentioning this fact is chiefly to show the influence the teacher may publicly wield if he would but avail himself of his opportunities. Mr. Turner has been of considerable value to his party in the parliamentary division in which he resides, and his political connections cause him to be particularly in request at the meetings of the teachers' organisations with which he is concerned. We were shown some of his correspondence with several well-known Members of Parliament, which was undertaken at the introduction of the Fee Grant. From this we learned that he had been instrumental in obtaining the payment of the Fee Grant quarterly, and particularly in getting the Half Time additional average paid for on the 10s. basis. Other evidences of his efforts for the benefit of Education were forthcoming which we noted with interest. Mr. Turner has been a member of the N.U.T. since he left college. He is a former President of the Huddersfield Association, a member of the Half-Time Council, and is Vice-President of the West Yorkshire District Union. It is a significant fact that the thirteen associations which comprise the West Yorkshire District Union, and which include the most influential of the Yorkshire Teachers' Association, unanimously nominated him for the position of Vice-President. He will next year succeed Mr. Alphonso Gardiner as President of the District Union.



Yours faithfully
Fred. Turner.

As a speaker he is logical and eloquent, and some of his finest oratorial efforts will long be remembered by his West Yorkshire friends. He has taken a great interest in the propagation of Technical Education, and was one of the pioneers of the movement which brought about the erection of the Holmfirth Technical School. Mr. Turner expressed disgust at the action of the Science and Art Department in rendering the Elementary School Teacher ineligible for a position on Science and Art Committees.

Perhaps one of the most notable characteristics of our subject is his devotion to Poetry, and he possesses no mean talent as a Poet. Dealing chiefly with religious subjects he has produced many verses of extremely good merit. The hymns sung by the children, both in his school and at the anniversary of the Church, have often been the products of his genius. The *Church Family Newspaper*, to which he is a frequent contributor, repeatedly bears witness to his poetical abilities. We were favoured with the opportunity of perusing several of the poems which have not yet made their public appearance, and if our opinion of them can be taken as a competent one, we can only say that Mr. Turner owes a duty to himself and the public so long as he refrains from their publication. One of the poems referred to, and which tells the story of the cure of Naaman's leprosy, and of the punishment of Gehazi, as related in 2 Kings, chap. v., is interesting. Any one familiar with the sacred story will easily recognise the following scenes which we were bold enough to cull from the poem. Naaman's request from Elisha is thus rendered:—

'Full of gratitude and reverence
back to old Elisha's door,
Praising loud the God of Israel
came the Syrian band once more.
Heavy bags of glittering silver,
golden pieces, raiment fine,
All were urged upon the Prophet;
all refused time after time.
Then a gift both strange and
simple, asked the warrior at his hand,
Earth enough to build an altar,
far away on Pharpar's strand.
From that time till his life ended
he would worship Israel's God,
Only when with King Ben-hadad
he the aisles of Rimmon trod—
When his noble kingly master
worshipped, leaning on his hand,
He would bow, but would not
worship; when his king *knelt*,
would he *stand*.
"Go in peace, Jehovah knoweth
all the secrets of the heart,
He will see that thou art steadfast, choosing still the better part."'

Again, describing the punishment of Gehazi:—

'"Tell me, pray thee, whence
thou comest?" To his lips
there came a lie.
How could he deceive the Prophet—vain and foolish 'twere to try.
"Went not then my own heart with thee, when the Syrian captain turned?
When he turned back to meet thee how thine heart for lucre burned!
Thinkest thou that this a time is to increase thy worldly store,
When a darksome cloud of evil gathers o'er the land once more?
Upon thee and upon thine offspring falleth now the leper's doom,
Sad and lonely shall thy life be—at the end a leper's tomb."
As he heard the awful warning, as he turned him round to go,
Mantled o'er his doomed body leprosy as "white as snow."'

Did our space permit we could furnish many other examples similar to those quoted. When one considers the scriptural teaching that is necessitated by the requirements of schools of the type of the New Mill National School, it is obvious what uses such poems as have been mentioned can be put to.

It is without the slightest hesitation that we state that it has not been within our experience to meet with many schoolmasters who carry out the spirit of religious instruction in such an earnest and conscientious manner as does Mr. Turner.

The protruding assertion of dogmatic teaching does not display itself in the slightest degree, yet one cannot but be impressed with the meek and simple reverence which pervades the whole school during the time occupied in devotional exercises.

This feature is one of the chief characteristics of the school, and has its due effect on the tone and work, as our further observations testify.

Dealing with the ordinary work of the school, we confess that we were amazed at the standard of the work done and the tone throughout, when we considered the difficulties to be dealt with. Here is a remarkable state of affairs. The Infants' School is in no way connected with the Mixed School. It is under entirely different management, being an Undenominational School. Some means ought certainly to be found for placing both schools under the same body of managers. The difficulty of the present position is obvious to any teacher. Another bane of the school is the 'half-timer.' A goodly number of these are in attendance, and to the facts mentioned should be added that the district is a scattered one, so that many of the scholars have considerable distances to walk. In winter this affects the attendance materially, as the mountainous nature of the neighbourhood renders attendance in many cases absolutely impossible. At the time of our visit, however, the attendance did not display any necessity for concern. The quiet unobtrusive character of the children impressed us at once. We found that Grammar was not taken as a class subject, History having taken its place. Geography is well taught by means of graphic and illustrative lessons.

The Writing attracts attention, and is of the upright character. Drawing is a feature of the school, the 'Excellent' being obtained, though the subject has only been taken since it became compulsory. The children display great anxiety to take part in the Varied Occupations which occupy part of the curriculum. The excellence of the drawing is enhanced by the colouring of the designs in water colours. Girls as well as boys produce artistic work of this kind. The Arithmetic lessons are divided into three parts, one-third of each lesson being devoted to Mental Arithmetic, one third to Blackboard Work, and the remaining third to Exercises. Mr. Turner believes in the *teaching* of Mental Arithmetic, and the work given on the Blackboard is of a similar nature to that previously done mentally, only, of course, of a more advanced and difficult nature.

A glance at the Time Table shows us that attempts are made to introduce a more educational curriculum than that which has so long held sway in our elementary schools. Basket weaving, for example, struck us as being an extremely useful accomplishment, and a commendable effort to develop the Kindergarten tuition, of which the foundation had been laid in the Infant School. We were willingly allowed to examine the various Reports which Mr. Turner has received during his career from Her Majesty's Inspectors. They all bear witness to those characteristics of his teaching which we have endeavoured to pourtray. The Reports from the Diocesan Inspectors are equally gratifying, the last received being as follows: 'The children answer with a thoroughness and zest which give proof of much careful teaching, and have well earned the "Excellent" mark.'

Our conversation with Mr. Turner upon professional topics bristled with ready and practical expressions of opinion which he let fall. He views the question of Rate Aid for Voluntary Schools as one which demands the attention of all classes of teachers, but he would solve the difficulty by increasing the Fee Grant to all schools taking advantage of it from ten shillings to fifteen. He strongly supports the existence of the dual system of elementary public schools, and believes that the managing body of a school should primarily represent the parents rather than the ratepayers. His efforts have been mainly put forth in connection with the West Yorks District Union towards the abolition of the Half-Timer. He views the fact that the Berlin pledge is still unredeemed as a stigma upon the Government.

Speaking upon Technical and Secondary Education, a matter with which he has been intimately connected, he said: 'I entirely approve of the suggestions made by our Union to the Royal Commission, and I look forward to the embodiment of those suggestions in the Report of the Commission. In connection with the Holmfirth Technical School my advice is often requested and needed, but although I receive no emolument from the managing committee in any form, the Science and Art Department debar me from serving on any of the committees because I am an elementary school teacher.'

We agreed with Mr. Turner that there was scope for the Union's work in this matter. We directed Mr. Turner's attention to the policy adopted by some Boards to enforce the teaching of religious dogmas, and the opposition which such a policy usually met with. He met this point by the following query: 'If it is a hardship to compel an unbeliever to pay for the public teaching of the divinity of Christ (which teaching he can avoid by means of the Conscience Clause), is it not as great or a greater hardship to compel a Christian to pay for the teaching, as religion, of doctrines which undermine and counteract the first principles of Christianity?'

Turning from this subject he summed up his view of the policy of the Union in these words: 'I am in favour of teachers becoming Civil Servants. In the meantime the N.U.T. should concentrate its energies upon the three vital points, *viz.*, Security of Tenure, Superannuation, and the Abolition of the Annual Examination and of Graduated Payments.'

As we wended our way down towards the railway station in the valley, after bidding adieu to our courteous host, we reviewed the events which we have recorded. The outspoken address of the President of the N.U.T. to the Oxford Conference forced itself before us, and we pondered upon what would be the outcome of the struggle on the part of the Voluntary Schools for more efficient equipment. If proof were needed that true educational work, equal to that produced in many lavishly-equipped establishments, is forthcoming in our Voluntary Schools, that the inculcation of a high moral purpose is infused into the pupils, and that there exist teachers who are willing and anxious to devote their energies and abilities to the realisation of such objects, we were convinced that we had plainly seen such proof during our visit to New Mill. Though the school we have described cannot be compared in many respects to the majority of those whose description have appeared in these columns, still it needs but an acquaintance with the New Mill National School and its Master to justify their inclusion in a series of sketches which pourtrays those of whom the profession is justly proud.

OUR PUPIL TEACHERS' COURSE.

SELECTED GOVERNMENT TESTS.

ENGLISH.—(Boys and Girls.)

(*Maximum Marks*, 120.)

(*Answer Questions* 1 and 6, *and two other questions.*)

FIRST YEAR.

1. Parse and analyse 'his sentence:—
But knowledge to their eyes her ample page
Rich with the spoils of time did ne'er unroll. (40)

2. Give the past tense and the past participle of these verbs:—
Strive. Do. Build. Shake. Hang.
Win. Burst. Sink. Rise. Shoot. (20)

3. Give the feminine of the following words:—
Earl, Bachelor, Monk, Wizard, Testator, Hero, Duke, Stag. (20)

4. What is the exact meaning of the final syllable in each of the following words:—
Friend*ly*, Rest*ful*, Penni*less*, Strong*est*, Golden, Princess, Duck*ling*, Great*ness*? (20)

5. Explain the terms *transitive verb, relative pronoun, indefinite numeral adjective*, and give examples of each. (20)

6. Reproduce in your own words the following story:—

As Broad as Long.

An Englishman and an American were once conversing about the merits of their respective countries. The Yankee related that once when he was fishing off the mouth of the Hudson he caught a magnificent codfish fifteen yards long. In turn the Englishman gave a vivid account of his capture of a flatfish fifteen yards wide in a small brook running through his native village. Cousin Jonathan brightened up, and said, 'Stranger, I have captured *you*. You haven't got a *flatfish* in me. How could you catch a fish fifteen yards wide in a small brook?' John Bull smiled, and replied, 'Well, perhaps we were exaggerating; so if you will deduct a few yards from the length of your codfish, I will correspondingly narrow my flatfish.' (40)

SECOND YEAR.

1. Paraphrase the following passage:—
How blest is he who crowns in shades like these
A youth of labour with an age of ease;
Sinks to the grave with unperceived decay,
While resignation gently slopes the way;
And all his prospects brightening to the last
His heaven commences ere this world be past. (30)

2. Analyse this sentence, and parse the words printed in italics:—
What I can do *to give* him satisfaction *I am perfectly ready* to do; but it is possible for an anxious friend to demand more than my ability *could perform*. (30)

3. What are auxiliary verbs? Make a list of them, and say what is the use or force of each. (20)

4. Give for each of the following prefixes six illustrative words:—*Circum, Re, Per, Contra*, and *Sub;* and six other words with each of these terminations:—*tion, tude, fy*, and *ity*. (20)

5. Give three examples of adjective sentences or clauses, and say how such sentences may generally be known. (20)

6. Write a brief essay upon '*The comforts of modern times.*' (40)

THIRD YEAR.

1. Paraphrase this passage:—
I am monarch of all I survey,
My right there is none to dispute;
From the centre all round to the sea
I am lord of the fowl and the brute.
O solitude! where are the charms
That sages have seen in thy face?
Better dwell in the midst of alarms
Than reign in this horrible place.
I am out of humanity's reach,
I must finish my journey alone,
Never hear the sweet music of speech,
I start at the sound of my own. (30)

2. Point out in the following verse the number of sentences, their relation to each other, and the principal parts of each. Parse also the words printed in italic.
There's not a *joy* the world *can give* like *that* it takes away,
When the glow of early thought declines in feeling's dull decay;
'Tis not on youth's smooth cheek the blush alone *which* fades so fast,
But the tender bloom of heart *is gone* ere youth *itself be past*. (30)

3. What do you know of the origin, formation, and precise meaning of the following words. Place each of them in a separate sentence of your own making:—
Distributive, Pre-eminence, Ellipse, Phonograph, Intimidate, Invulnerable, Graminivorous, Extempore, Overweening, Defendant, Recognition, Atheist. (20)

4. What kind of sentences are those which are introduced respectively by the following words:—
Nevertheless, Since, Because, If, For, But, As, Where.
Give an example in each case. (20)

5. If any of the following sentences are faulty, correct them, and give your reasons :—

The Committee were divided in opinion.

The sad faces and joyous music formed an incongruous sight.

It was almost intolerable to be borne.

Neither his conduct nor his language appear to me to be satisfactory.

If that I thought he would not come,
No longer would I stay.

I rarely or ever see him now. (20)

6. Write about 24 lines upon '*The uses of Arithmetic.*' (40)

GEOGRAPHY.—(Boys and Girls.)

(*Maximum Marks*, 80.)

(*Answer Question* 6, *and any two others.*)

First Year.

1. Name the chief British manufacturing centres of cotton, linen, hardware, and pottery : and account for the rise of the trades in the several districts. (25)

2. Name the counties and chief towns through which the following rivers flow :—The Yorkshire Ouse, the Severn, and the Clyde. (20)

3. Describe a voyage from Glasgow to Inverness by the Caledonian Canal. Why was this canal made? (20)

4. Where and what are the following :—Halifax N.S., Paramatta, Fredericton, Toronto, and Victoria? (20)

5. Under what conditions do rivers form deltas? Give instances, and state the effect on commerce. (25)

6. Draw a map of Ireland. (30)

Second Year.

1. Describe the climate and productions of Ceylon and Jamaica. (25)

2. Name the products of three of the various tropical lands under British rule. (20)

3. Into what three portions does India divide itself? Briefly describe one of them. (20)

4. Explain the terms :—Meridian, Tropic, and Arctic Circle? What is the interval between noon at London, and at places in 30° and 175° E. Long., and in 30° and 175° W. Long., respectively? (25)

5. Describe the positions of Madrid, Berlin, Cracow, Naples, Simla, Madras, Lucknow, and Delhi. (20)

6. Draw a map of the basins of the Seine and Loire. (30)

Third Year.

1. What are the Trade Winds? How do they assist or impede navigation? (25)

2. Write a brief account of the races of Africa. (20)

3. Give some account of the climate and productions of British East Africa. (20)

4. Where and what are the following?—Hoang Ho, Amoy, Corea, Samarcand, Amur, Manipur, Everest, Persepolis, Dooab. (25)

5. Describe a coasting voyage from Rangoon to Pekin. (20)

6. Draw a map of British India east of the Sunderbunds. (30)

HISTORY.—(Boys and Girls.)

(*Maximum Marks* 80.)

(*Answer three questions only.*)

First Year.

1. Name any authors during the first ten centuries who wrote about Britain, or who lived in Britain, and say what they wrote. (30)

2. Richborough, Bamborough, Bath, Chester, Edinburgh, London. Show the importance of these places in early times. (25)

3. What portions of the country were most influenced by British, Danish, and Saxon occupation respectively. How are any of the local names a guide in this? (25)

4. Give any particulars that you can of the early Irish and Roman missionaries in England. (25)

5. Which do you consider the three most important battles in the period of history you have studied, and why? (25)

Second Year.

1. What English princes took part in crusades, and what good or harm may Western Europe be considered to have derived from these wars? (25)

2. Give an outline of the reign of Richard I. or Richard II. (25)

3. What do you consider the three most noteworthy events in the 14th century, and why? (25)

4. What do you know of the composition of the parliaments prior to the reign of Edward I.? Where were they held? (30)

5. Sketch the gradual decline of the English power in France after the death of Henry V. (25)

Third Year.

1. Explain the terms :—Benevolences, Star Chamber, Ship-Money, Exchequer, Legate, and Cardinal. (25)

2. What do we hear of the Dutch in the time of Elizabeth, of Cromwell, and of Charles II.? (25)

3. Drake, Newton, Monmouth, Bacon, Blake. What do you know of any of these? (25)

4. Compare the characters of Charles I. and Charles II., and account shortly for the troubles of the one reign, and the comparatively peaceful character of the other. (30)

5. Construct a table showing the relationship, either between Elizabeth and Mary Queen of Scots, or between James I. and William III. (25)

NEEDLEWORK.—(Girls.)

(*Maximum Marks*, 60.)

First Year.

1. Cut out and tack together the upper part of a girl's chemise.

2. Make a button-hole, and sew on a button.

Second Year.

1. Make up in print a short sleeve of a child's frock.

2. Draw the flat pattern of a boy's shirt (¼ size).

Third Year.

1. Cut out in paper and tack together a frock bodice for a child three years old.

2. Darn a cross-cut (¾ of an inch long) on coarse linen.

TEACHING.—(Boys and Girls.)

(*Maximum Marks*, 40.)

(*Answer two questions only.*)

Second Year.

1. In giving lessons on counting to very young children, say what apparatus you would find useful, and how you could make such lessons effective if you had no apparatus. (20)

2. What is meant by *distinct articulation* in reading? Name any words which present special difficulty to learners, and mention any form of exercise that is most useful in correcting faulty articulation? (20)

3. Show how you would group the manuscript capital letters in the English alphabet for teaching? (15)

Third Year.

1. Make up half a dozen good testing questions in arithmetic, for scholars who are supposed to have been a year in the Fourth Standard, and to be ready for promotion to the Fifth. (15)

2. In teaching grammar, say in what order you would take the several parts of speech, and give your reasons. Which should be taken first, the *examples* or the *definitions ;* and why? (20)

3. Write out complete notes of a lesson on one of the following subjects :—

(*a*) The House of Commons.
(*b*) (*For Infants.*) The primary colours.
(*c*) The uses of the electric telegraph.
(*d*) Mountains. (20)

EUCLID.—(Boys only.)

(*Maximum Marks*, 50.)

[All generally understood abbreviations and symbols for *words* may be used, but not symbols of *operation*, such as —, +, ×.]

(*Answer Question* 3, *and one other question.*)

SECOND YEAR.

1. If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise their bases equal; the angle which is contained by the two sides of the one shall be equal to the angle contained by the two sides equal to them, of the other. (20)

2. Any two sides of a triangle are together greater than the third side. (15)

3. From two given points on the same side of a given straight line, draw two straight lines which shall meet in the given line and make equal angles with it. (30)

THIRD YEAR.

1. Define a *parallelogram*. The opposite sides and angles of parallelograms are equal to one another, and the diameter bisects them, that is, divides them into two equal parts. (20)

2. To describe a square on a given straight line. Give the corollary. (15)

3. If the middle points of any two sides of a triangle be joined, the triangle so cut off is one quarter of the whole. (30)

ALGEBRA.

THIRD YEAR.—(BOYS ONLY.)

(*Maximum Marks*, 50.)

(*Answer Question* 4, *and two others.*)

1. The product of two algebraical expressions is $a^7 - 64a$, and one of the expressions is $a^3 - 2a + 4$; what is the other? (14)

2. Find the Greatest Common Measure of 102 $(a^4y + 9ay - 20y)$ and 119 $(5a^4x + 9a^3x - 64x)$. (16)

3. Simplify—

$$(a)\quad \frac{1}{p-3} + \frac{1}{p+3} - \frac{6}{p^2-9}; \quad (8)$$

and show that

$$(b)\quad \left(q - \frac{a^2 - pq}{q-p}\right)\left(p + \frac{a^2-pq}{q-p}\right) + \left(\frac{a^2-pq}{q-p}\right)^2 = a^2. \quad (8)$$

4. (*a*) What axioms are frequently used in the solution of equations? (4)

Solve:—

$$(b)\quad \frac{3x-1}{11} - \frac{2(x-1)}{5} = \frac{2-x}{10}, \quad (7)$$

$$(c)\quad \frac{5(x-2)}{x+2} - \frac{2(x-3)}{x+3} = 3. \quad (7)$$

MENSURATION.

THIRD YEAR.—(BOYS ONLY.)

(*Maximum Marks*, 20.)

(*Answer One Question only.*)

1. Find the ratio of the areas of the triangles whose sides are 11, 90, 97 and 11, 25, 30. (20)

2. Find the rent of a square field whose diagonal is 7 chains 15 links at £4 10s. per acre. (20)

ARITHMETIC.

(*Maximum Marks*, 100.)

(*Answer the last Question, and two other Questions.*)

FIRST YEAR.—BOYS.

1. A boy after losing $\frac{2}{5}$ and afterwards $\frac{1}{3}$ of his original stock of marbles, found that he had 22 marbles left; how many had he at first? (25)

2. How many pieces, each 3·06 inches long, can be cut from a wire whose length is 54 inches; and what will be the length of the piece of wire remaining? (30)

3. Simplify $\frac{(2\frac{1}{2} - \frac{1}{2}) \text{ of } (1\frac{1}{3} + \frac{2}{7})}{(\frac{2}{3} + \frac{1}{2}) \text{ of } \frac{2}{5} \div \frac{2}{5} \div 1\frac{1}{13}}$. (30)

4. Compare the values of $\frac{1}{3}$ $(2\frac{1}{2} - \frac{2}{5})$; $\frac{1}{3}$ of $(2\frac{1}{2} - \frac{2}{5})$; and $2\frac{1}{2} - (\frac{1}{3}$ of $\frac{2}{5})$. (30)

5. Add together 3·05 of 1s. 8d.; 4·375 of £5 2s. 6d.; 7·08 of £1 17s. 6d. (30)

6. Explain, by reference to the corresponding vulgar fractions, why ·307 is equal to ·30700. In what other way can you explain this equality? Why is it wrong to read ·307 as "*decimal three hundred and seven.*" Find the value of ·749 of 1 ton 1 cwt. 1 qr. (40)

GIRLS.

1. Find, by Practice, the cost of 13 miles 7 furlongs 11 yards of railing, at £31 16s. 8d. per mile. (30)

2. How many eggs, at 2s. 11d. a score, can be bought for £7 13s. 1½d.? (30)

3. By how much is $\frac{1}{10} - \frac{1}{7} + \frac{2}{5} - \frac{1}{15}$ greater than $\frac{17}{140}$? (25)

4. If a cwt. of coal cost 19s. 10d., what must be paid for 5 tons 19 cwt. 72 lbs.? (30)

5. Make out the following account:—

23 oxen at £18 13s. 4d. each.
145 sheep at £38 10s. per score.
96 pigs at 5½ guineas for six.
45 fowls at 5s. 9d. a couple. (30)

6. Describe two ways of working a sum in simple Subtraction, and explain each method fully. (40)

SECOND YEAR.—BOYS.

1. Find the compound interest on £2,756 for 2 years at 4 per cent. per annum, correct to the nearest penny. (30)

2. A tradesman sells tea at 2s. 1d. per lb., and takes off 5 per cent. for cash payment; find what it cost him per cwt., sold for cash, in order that he may make a profit of 33 per cent. (30)

3. A man travelled 520 miles by sea, rail, and coach. The distance by coach was one-third that by rail, the distance per rail one-third that by sea. The charges at sea were 1d. per mile, by rail 2d., by coach 4½d. Find the average cost per mile for the whole journey. (30)

4. Define stock, funds, consols, par, brokerage.
By investing £960 in a 2½ per cent. stock, I obtain an income of £30 a-year; what is the price of stock? (Brokerage may be neglected.) (40)

GIRLS.

1. Simplify $\dfrac{\frac{1}{6} + \frac{1}{8} - \frac{1}{2} - \frac{1}{8}}{\frac{1}{2} - \frac{1}{8} + \frac{1}{2} + \frac{1}{8}} \div \dfrac{\frac{1}{2} + \frac{1}{8}}{\frac{1}{2} - \frac{1}{8}} + \dfrac{\frac{1}{2} - \frac{1}{8}}{\frac{1}{2} + \frac{1}{8}} \div \dfrac{60}{61}$. (30)

2. Reduce 8s. 4½d. to the fraction of £100, and 7 cwt. 0 qr. 7lb. to the fraction of 11 cwt. 0 qr. 11lb. (30)

3. Find the value of $\frac{19}{132}$ of a mile $- \frac{7}{88}$ of $3\frac{1}{4}$ furlongs $- \frac{5}{11}$ of 49 yds. 1 ft. 6 in. (30)

4. If I divide a sum of money among four girls, giving one-third of it to A, one-fourth of the remainder to B, three-fifths of the remainder to C, and the five shillings left to D; find the whole sum. (40)

THIRD YEAR.—BOYS.

1. If 36 cwt. 3 qrs. 23 lbs. 7 oz. of iron be worth 209 yds. of calico, how many yards of calico must be worth 16 cwt. 3 qrs. 5 lbs. 9 oz. of iron at the same rate? (30)

2. A ship was insured so as to cover the value of the ship and the premium paid. The premium of 4½ per cent. on the amount insured amounted to £1,788 15s. What was the value of the ship? (30)

3. Reduce 23 cwt. 1 qr. 7 lbs. to the decimal of 36 cwt. 2 qrs. 15 lbs., and find the value of 3·843 × £1 0s. 9½d. (30)

4. Show that division by $\frac{2}{3}$ is equivalent to multiplication by $\frac{3}{2}$, and division by $\frac{3}{5}$ is equivalent to multiplication by $\frac{5}{3}$. Take the examples—

$$12s. \div \tfrac{2}{3} = \tfrac{3}{2} \times 12s.$$
$$15s. \div \tfrac{3}{5} = \tfrac{5}{3} \times 15s. \quad (40)$$

GIRLS.

1. In a ship a certain number of men receive 63s. a week, five times as many 42s. 6d., and fourteen times as many 17s. 6d. If £182 3s. 6d. be the weekly payment to all, find the number of men. (30)

2. Find the value of ·000416 of a ton + ·0512 of 1 cwt. 13 lbs.— ·171 of 1 qr. 9lbs. (30)

3. Divide a profit of £355 among three partners, whose capitals are £735, £840, and £910. (30)

4. A cistern, holding 800 gallons, is filled by three pipes in 25 minutes. One pipe discharges 5 gallons more and the other 3 gallons less than the third per minute. Find how much flows through each pipe in a minute. (40)

MUSIC.—(Boys and Girls.)

Staff Notation.

(*Maximum Marks*, 40.)

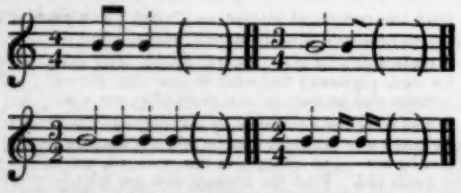
(*Answer two questions only.*)

First Year.

1. Write above each of the following notes its value-name (crotchet, &c.), and below each its pitch-name (C, D, &c.):

(20)

2. Complete each of the following bars by adding one note at the end:



(20)

3. Write below each of the following intervals its name (major third, &c.):

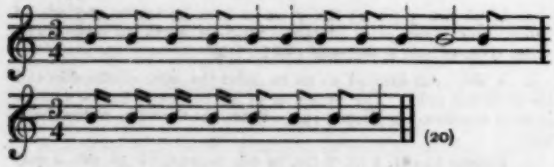
(20)

Second Year.

1. Add bars to the following in accordance with the time-signatures:

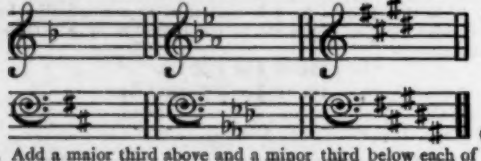
(*a*)

(*b*)



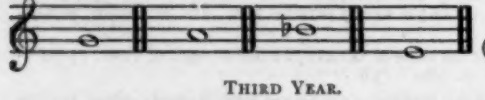
(20)

2. State what major keys are shown by the following signatures:



(20)

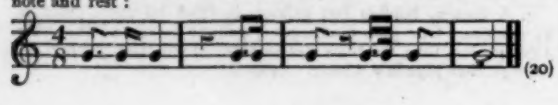
3. Add a major third above and a minor third below each of the following notes:



(20)

Third Year.

1. Re-write the following in $\frac{6}{8}$ time, doubling the value of every note and rest:



(20)

2. State (briefly) the meanings of the following terms:—(*a*) Accelerando; (*b*) Allegro; (*c*) Mezzo Forte; (*d*) Calando; (*e*) Allegretto; (*f*) Sforzando. (20)

3. Write below each of the following intervals its name (minor third, etc.):

(20)

Tonic Solfa Notation.

First Year.

1. Name the following intervals:—(*a*) *ray* to *te*; (*b*) *fah* to *lah*; (*c*) *me* to *doh*^{1}; (*d*) *soh* to *ray*; (*e*) *te*$_1$ to *lah*. (20)

2. What is the mental effect of the following scale tones?—(*a*) *ray* (not *ray*^{1}); (*b*) *te*; (*c*) *soh*; (*d*) *lah*. (20)

3. Re-write the following, doubling the value of every note and rest. Use four-pulse measure.

| ,m :s . | f :- ,m | r : | d :— ‖ (20)

Second Year.

1. Re-write the following passages without changing key:

(*a*) s r m d ^{m}l$_1$ t$_1$ d r f t$_1$ m l$_1$ ^{r}l s m f r d (10)

(*b*) m t$_1$ d ^{r}d f m r s f l$_1$ m ^{r}s t d^1 r^1 d^1 (10)

2. Name the following intervals:—(*a*) *ray* to *fe*; (*b*) *me* to *ta*; (*c*) *doh* to *fe*; (*d*) *fe* to *ray*^{1}; (*e*) *ta*$_1$ to *fah*. (20)

3. Write over each note and rest in the following its value in pulses or fractions of a pulse:

| m .r ,d :s .,f :m . | s :— :- .l }

| t .d^1 :s ,f .m :r | s ,f .m ,f :m :— ‖ (20)

Third Year.

1. Write (in figures) very distinctly over each note and rest in the following passage its value in pulses or fractions of a pulse:

| .r :m .f ,r | m :- .f | s ,l .s ,f :m ‖ (20)

2. State (briefly) the meanings of the following terms:—(*a*) Accelerando; (*b*) Allegro; (*c*) Mezzo Forte; (*d*) Calando; (*e*) Allegretto; (*f*) Sforzando. (20)

3. If the first note of each of the following passages is regarded as *me*, what will the others become?

(*a*) l d^1 ta s f r ta r^1 d^1 (10)

(*b*) t s fe l r fe d^1 r^1 t (10)

PENMANSHIP.

All Years, Boys and Girls.

(*Maximum Marks*, 40.)

Write in largehand, *Ephphatha*.

Write in smallhand, '*The quick brown fox jumps over a lazy dog.*'

ANSWERS TO PUPIL TEACHERS' TEST QUESTIONS.

Algebra.

I. $a^5 + 2a^4 - 8a^3 - 16a$; II. $17(a^2 + a - 4)$; III. (*a*) $\frac{2}{p+3}$; IV. (*b*) 4; (*c*) $-4\frac{1}{2}$.

Mensuration.

I. As 3 : 1; II. £11 10s. 0·615d.

Arithmetic.

First Year, Boys. I. 45; II. (*a*) 17; (*b*) 1·98 ins.; III. $3\frac{27}{175}$; IV. $\frac{19, 19, 69}{30}$; V. £35 19s. 4½d.; VI. 15 cwt. 3 qrs. 21 lbs.

First Year, Girls. I. £441 17s. 8½d.; II. 1050; III. $\frac{25}{252}$; IV. £118 12s. 11d.; V. £807 6s. 6½d.

Second Year, Boys. I. £224 17s. 9d.; II. £8 6s. 8d.; III. 1½d. per mile; IV. £72.

Second Year, Girls. I. 1; II. (*a*) $\frac{87}{16000}$; (*b*) $\frac{7}{11}$; III. 100$\frac{5}{8}$ yards; IV. £1 5s. 0d.

Third Year, Boys. I. 95 yards; II. £37,961 5s. 0d.; III. (*a*) ·63; (*b*) £4.

Third Year, Girls. I. 140 men; II. 1 lb.; III. £130; IV. 15 galls., 7 galls., 10 galls.

N.B.—In answer to several correspondents, we can cordially recommend the excellent and up-to-date collection of Government Pupil Teachers' Questions published by the National Society.

THE 1894 SCHOLARSHIP EXAMINATIONS.

BY GEORGE BEACH, M.A., LL.D. (DUBLIN).

Author of '*Elements of English*,' '*A Girls' Arithmetic*,' '*Entertaining Readers*,' *etc.*

I.—(*a*) THE PRACTICAL TESTS IN MUSIC used at the recent Scholarship Examination were given in full in our last issue at considerable inconvenience on account of pressure of matter. As these are always the same, or nearly the same, at every examination, it is of great importance to master them thoroughly, for thereby a candidate can in this subject be secure of successful results.

(*b*) Intervals appear to be the most puzzling portion of this subject, and indeed even among experts there is so much variation in naming and reckoning intervals, that some confusion in the 'lay' mind may be pardoned. Remember however that:—

(1) Minor intervals are a semitone less than major; thus whilst a major third has four semitones, a minor third has only three.

(2) Augmented intervals have a semitone more than major; thus an augmented third has five semitones.

(3) Diminished intervals have a semitone less than minor; thus a diminished third has two semitones, and but for its notation might be accounted a major second.

(4) An augmented interval when inverted becomes a diminished one.

(5) A diminished interval when inverted becomes an augmented one.

(6) A major interval when inverted becomes a minor one.

(7) A minor interval when inverted becomes a major one.

(8) A perfect interval when inverted becomes an imperfect one.

(9) An imperfect interval when inverted becomes a perfect one.

(10) A fifth, fourth, second, sixth inverted become respectively a fourth, fifth, seventh, third.

(11) If an interval have x semitones, then its inversion has $12-x$ semitones. Thus if a diminished seventh have nine semitones, an augmented second will have three semitones.

(12) Only fourths and fifths are called perfect and imperfect.

II.—

Aldermen.—Next in order after members of the Saxon royal family (or Ethelings), were the *aldermen* or *earls*. The districts which they governed were denominated shires, and, although small at first, were afterwards enlarged to the extent of our present counties. At the accession of Canute the title *jarl* (or *earl*) was substituted for *ealdorman*, and his policy, continued by the later Saxon monarchs, added still further to their authority by comprising several shires within the same earldom.

Had not William the Conqueror reversed his policy, the devolution of England as a united nation would have been, as in the case of France, much longer postponed; and the central authority, upon which cohesion at that time depended, would have been greatly reduced. In modern times the term *aldermen* has been resuscitated, and is now applied to those members of the county and borough councils who have not been elected by the suffrages of their fellow-citizens, but co-opted to their position by the votes of the councillors themselves.

It is time now that dates, and in fact all memory work, be taken seriously in hand (or rather in head). These, together with dynastic tables, tables of campaigns, provisions of statutes, should now be ready for use.

When writing out the two former, much greater credit will be secured by also inserting the proper dates.

Justice in Eyre, a term that has puzzled many, simply means *justice in itinere*, or a judge who goes on circuit.

The following ranks are members of the House of Lords, arranged in due order of precedence.

(1) Dukes, princes of the blood; (2) archbishops; (3) dukes; (4) marquises; (5) earls; (6) viscounts; (7) bishops; (8) barons.

The two archbishops are:—

Canterbury.—Edward White Benson, D.D.

York.—William Dalrymple Maclagan, D.D.

The senior dukedom is that of Norfolk, dating from 1483; the senior marquisate that of Winchester, 1551; the senior earldom that of Shrewsbury and Talbot, 1442; the senior viscountship that of Bolingbroke and St. John, 1712; the senior barony that of Le Despencer, 1264. The bishops are the only 'life peers.'

III.—FAULTS IN MAP-DRAWING.

(1) Owing to ultra-puritanical notions, colour is altogether discarded. Now whilst we freely acknowledge that no amount of chromatic effect will translate a bad map into a good one, yet we as firmly assert that the judicious use of a blue and of a red lead will secure additional marks. 'Tis at any rate a sign of elaboration and art, and an evidence of a desire to please.

(2) Not nearly enough variety of type or character of letter is used. The same sort of letter should not be used for ATLANTIC OCEAN, NEW YORK, and *Patterson*.

Manuscript characters of ordinary writing style are often introduced, to the great loss of the careless one.

Many names are not written horizontally. Certainly we know that this position of river and mountain names is often impossible, but with towns, capes, boundaries, it should be invariable.

(3) Names of boundaries are often omitted, and frequently insignificant names are inserted to the neglect of more important ones.

(4) Perhaps rivers are most inartistically drawn. Often they are broader at the source than at the mouth, and become astonishingly smaller after receiving important tributaries.

These latter are often 'stuck-on' haphazard in such a way as to be natural freaks, and at times in opposition to the current of the main river.

(5) Lines of latitude and longitude are sometimes conspicuous by their absence, and at other times by their misplacement. Very seldom in the map of a continent or large country is the convergence of the meridian accurately reproduced.

IV.—THE SCHOLARSHIP EXAMINATION will commence on Wednesday, December 19, 1894. Permission to attend it should be immediately sought; the marks for Repetition, Reading, and Teaching should be secured at next school inspection, and care must be taken that a due entry of the candidate's intention to sit is inserted in the School Examination 'Form 9.' Form 13 must be filled up and returned to the Department before October 1.

V.—DICTATION.

This exercise contains on an average one hundred and fifty words, which are dictated about eight or nine per minute. The passages vary greatly in difficulty, but as a rule contain no unusual or technical words. Favourite traps are baited with words ending in -eive, -ieve; -ant, -ent; -ance, -ence; -ize, -ise; -able, -ible; -ure, -eur; -ent, -ence; -ant, -ance; -us, -ous; -or, -our; -ate, -ite; -m, -mn; the terminations -ue, -ique, -esque, exe, and words where the variant spelling differentiates the meaning of identical sounds. The excerpt must be properly punctuated; there must be no writing between lines, no division of words between two consecutive lines, and no abbreviations, as plenty of space is allowed. Omissions, erasures, and Americanisms are counted as mistakes.

VI.—ENGLISH.

Until recently the study of Modern Languages had no part in a liberal education. However much they may have been appreciated for their practical use, their educational value was absolutely unrecognised. This neglect was carried to its fullest length in England as regards our own 'Mother Tongue.' Further, the study of English, and the capacity of our language,

were positively contemned, and an educated man able to translate Milton into pure Latin hexameters would have been ashamed to acknowledge a critical acquaintance with the speech of his native land. Ignoring the Teutonic basis of English, he was quite satisfied with that knowledge of it which the comparative Grammar of Latin and Greek afforded him; and thus entirely failed to become saturated with the genius of Anglo-Saxon.

To this neglect it is owing that for many years no sound treatise upon the English Language was in existence, and even now, in a few out-of-the-way Elementary Schools, and in many reputable Grammar Schools, obsolete manuals survive.

It cannot be said that Scholarship English is difficult, but yet it is comprehensive, and covers a fairly wide area, even if it be not profound in its requirements.

What these requirements are it would be here waste of time to insert, as they can be found in the four years' syllabus of the Pupil Teacher Course, and their interpretation and the style of question propounded upon them can be well studied from the large number of Departmental queries which we give, and even more from the Model Answers which we periodically insert.

No space remains to us further than to suggest that—

(*a*) The voice of Verbs should be carefully studied.

(*b*) The Irregular Verbs require much attention, especially such as 'fly' and 'lie,' which have more than one meaning.

(*c*) In Parsing the degree of the Adverb, the double power of the Connective Adverb, the number of the Demonstrative Adjectives, the qualifying by Particles, and the quotation of syntactical rules employed, should not be omitted.

(*d*) Participles should not be expanded into Adjective sentences, *e.g.*, 'The man *condemned* to death effected his escape' must not be parsed as 'The man [who was] condemned,' etc.

VII.—Greatest Common Measure.

Find G.C.M. of—

1891. x^3-3x^2+4x-2 and x^3+2x^2-4x+1.
Ans. $x-1$.

1890. $6x^3-17x^2+22x-15$ and $8x^3-22x^2+27x-18$.
Ans. $2x-3$.

1883. $x^3-3x^2-13x+15$ and $x^3+9x^2+11x-21$.
Ans. x^2+2x-3.

1892. $7x^4-10x^3+3x^2-4x+4$ and $8x^4-13x^3+5x^2-3x+3$.
Ans. $x-1$.

1887. $x^3y+2x^2y^2+2xy^3+y^4$ and $5x^5+10x^4y+5x^3y^2$.
Ans. $x+y$.

1881. $x^4+7x^3+6x^2-32x-32$ and $x^2+9x+20$.
Ans. $x+4$.

1889. $6x^3-10x^2+10x-4$ and $9x^3+3x^2+3x-6$.
Ans. $3x-2$.

Find G.C.M. and L.C.M. of

1888. $6a^3-5a^2x-6ax^2$; $4a^3x-12a^2x^2+9ax^3$ and $6a^2x-13ax^2+6x^3$.

Answers. $\begin{cases} 2a-3x. \\ ax(2a-3x)^2(3a+2x)(3a-2x). \end{cases}$

Reduce to lowest terms—

1885. $\dfrac{x-8x^2+15x^3}{x-x^2-20x^3}$. Ans. $-\dfrac{3x-1}{4x+1}$

$\dfrac{(a+b+c)^2+(a-b)^2+(b-c)^2+(c-a)^2}{a^2+b^2+c^2}$. Ans. 3.

1886. $\dfrac{39(x^4-4x^2+4x^2-1)}{65(x^4+4x^2-4x-1)}$. Ans. $\dfrac{3(x^3-3x^2+x+1)}{5(x^3+x^2+5x+1)}$

Fractions.

Simplify—

1886. $\left(\dfrac{2x-y}{x+2y}-\dfrac{x-2y}{2x+y}\right)\div\dfrac{x^2+y^2}{x^2+2xy}$. Ans. $\dfrac{3x}{2x+y}$.

1888. $\dfrac{3x-4y}{4x+5y}-\dfrac{4x-5y}{5x+6y}+\dfrac{1}{20}$.

Ans. $\dfrac{y(9x+50y)}{(4x+5y)(5x+6y)20}$.

1889. $\dfrac{x^3+2}{(x-2)^2(x^2+1)}-\dfrac{4}{5(x-2)}-\dfrac{x+2}{5(x^2+1)}$.

Ans. $\dfrac{x^2+2}{(x-2)^2(x^2+1)}$.

1887. $\dfrac{1}{x-1}-\dfrac{1}{2(x+1)}-\dfrac{x-3}{2(x^2+1)}$.

Ans. $\dfrac{x(3x+1)}{(x^2+1)(x^2-1)}$.

1882. $\left(x+2+\dfrac{4}{x-2}\right)\div\left(\dfrac{x^3}{x^2-4}-x\right)$. Ans. $\dfrac{x(x+2)}{4}$.

1892. $\dfrac{\frac{x}{y}-1+\frac{y}{x}}{\frac{x}{y}+1+\frac{y}{x}}\times\dfrac{\left(\frac{x}{y}\right)^3-1}{\left(\frac{y}{x}\right)^3+1}\times\dfrac{y^2+xy}{x^2-xy}$. Ans. $\dfrac{x^2}{y^2}$.

1890. $\dfrac{1}{x-y}-\dfrac{2x}{x^2-y^2}-\dfrac{3x^2}{x^3-y^3}$.

Ans. $\dfrac{y^3-3x^2y-4x^3}{(x-y)(x+y)(x^2+xy+y^2)}$.

VIII.—Euclid.

Converse of Propositions.—There is no converse to problems, but every theorem has at least *one* converse, and sometimes *many*. When the whole or a part of the conclusion of *Proposition A* forms the hypothesis of a kindred Proposition B, whilst the whole or a part of the hypothesis of *A* forms the conclusion of B, then A and B are converse propositions.

Proposition A (Euclid I. 5)—

The Hypothesis is 'Two sides of a triangle are equal.'

The Conclusion is 'The angles opposite the equal sides are equal.'

Proposition B, Converse to A (Euclid I. 6)—

The Hypothesis is 'Two angles of a triangle are equal.'

The Conclusion is 'The sides opposite the equal angles are equal.'

As in this instance, Converse Propositions lend themselves readily to indirect proof by means of the method *Reductio ad absurdum*.

Again, let us examine Euclid I. 4 as an instance of *two* Converse Propositions.

Proposition A—

Hypothesis.—Two sides of one triangle equal each to each to two sides of another triangle. The included angles equal.

Conclusion.—The bases equal.

Proposition B, Converse of A—

Hypothesis.—Two sides of one triangle equal each to each to two sides of another triangle. The bases equal.

Conclusion.—The included angles equal.

Proposition BB, Second Converse of A—

Hypothesis.—The bases equal. The included angles equal.

Conclusion.—The sides are equal each to each.

This converse is false, and to rectify it another condition must be added to the hypothesis, viz., that 'the areas of the triangles are also equal.'

Even in simple propositions, the converse is not always true. It is true that 'If two triangles have all the sides equal to one another each to each, they have also all their angles equal to one another each to each'; but it is false (taken universally) that 'If two triangles have their three angles equal to one another each to each, they shall likewise have their three sides equal to one another each to each.' When a false converse proposition is converted into a true one by an addition to the hypothesis, this addition forms in the original proposition a true (even if unmentioned) portion of the conclusion.

Thus it is true that 'If two triangles have their three angles equal to one another, each to each, *and likewise have their areas equal*, they have their three sides equal, each to each.'

Euclid does not always insert even the true converses of his theorems, *e.g.*, Converses of I. 34—

'If in any quadrilateral the opposite sides and angles are equal, the figure is a parallelogram.'

Our readers should write out in their note-books all the converse propositions, stating whether they be true or false, and what further hypothesis is required to rectify the conclusion.

IX. Model Answers to Scholarship.

A.—SCHOOL MANAGEMENT.

1. Write full notes of a lesson on one of the following subjects:—
   (*a*) A Railway Ticket. (*For Infants.*)
   (*b*) The Thermometer.
   (*c*) The Conquest of Wales.
   (*d*) A 'composition' on Industry.

N.B.—*Every question on School Management could easily have been answered from Flux's 'Scholarship School Management.'*

1. (*b*) NOTES OF A LESSON ON THE THERMOMETER.

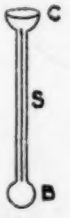
This lesson was also required at last Pupil-Teacher Examination.

Class.—Standard VI.

Time.—40 Minutes.

Apparatus.—Thermometer, Bladder, Bulb-tubes, some Mercury, Ice in glass, Water-boiling Apparatus.

Objects.—(1) To impart scientific principles.
(2) To encourage observation by experiments.
(3) To increase knowledge.

Matter.	*Method.*
I. Heat expands, cold contracts volume.	I. Illustrate by expansion of partially filled bladder heated.
II. Thermometer (heat-measurer, from *thermos* = heat and *metron* = measure) utilises this principle to measure temperature of bodies.	II. Thermometer should be handled, breathed upon, placed near spirit lamp, placed in ice-glass, etc. The substance in tube expands (and rises) for increase of temperature, and *vice versâ*.
III. Advantages of ordinary thermometer. (*a*) Acts uniformly. (*b*) Is sensitive to small variations. (*c*) Is portable.	III. Show (*a*) and (*b*) as above. Even medical men carry a thermometer. Thermometers might be made of materials too heavy or too large.
IV. Parts of thermometer :— (*a*) Glass tube with bulb. (*b*) Mercury or Alcohol within. (*c*) Frame and Scale.	IV. Compare calibre of tube with bulb. Explain advantages of Mercury and Alcohol. Frame should be non-conducting. Scale required for convenience and accuracy.
V. How the thermometer is made. 	V. (*a*) Produce tube with receiving cup at top and closed bulb at bottom. (*b*) Expel air by applying heat to bulb ; some mercury will then sink into tube and bulb. Repeat the process, finally boil the mercury, and all air and moisture will be expelled. (*c*) Seal tube at top by melting the glass.
VI. Graduation of tube.	VI. (*a*) Get freezing point by means of ice in glass (32°). (*b*) Boiling point by water-boiling apparatus (212°). (*c*) Make interval into 180 equal parts.

Recapitulate at end of No. III. and No. VI. Also draw sketches on blackboard.

2. What are (*a*) the merits and (*b*) disadvantages of simultaneous reading ?

(*a*) *Merits.*
(1) All get practice in reading. In a large class some would otherwise be neglected.
(2) A model style of tone, pitch, rate, fluency, phrasing, and expression can be collectively acquired.
(3) Stammering, hesitancy, and nervousness are minimised.
(4) Discipline is more easily preserved.
(5) Faults common to all can be corrected by class teaching and practice.

(*b*) *Disadvantages.*
(1) It requires a room to itself.
(2) Its excess tires out the class.
(3) It shelters the lazy and careless.
(4) Individual errors and faults are not discerned.
(5) Individual excellencies have no scope, and a dead level results unless guarded against.
(6) It, if used too much, destroys the confidence necessary for individual reading.
(7) The apparent results are often misleading, the better scholars' exertions being too much in evidence.

Used with discretion, simultaneous reading is a very valuable exercise.

3. Make a list of the commonest errors to which teachers are liable in teaching arithmetic to very young children.

(*a*) The concrete is too much neglected.
(*b*) Tables and even counting are not explained.
(*c*) Unscientific methods, such as 'borrowing,' etc., in subtraction, are employed.
(*d*) Mechanical aids are too freely allowed.
(*e*) Mental Arithmetic is omitted.
(*f*) The place value of figures is merely told, not elucidated.
(*g*) Processes are imposed upon children instead of being educed.
(*h*) The blackboard is insufficiently used.
(*i*) Too rapid progress is expected.
(*j*) Errors in processes are confused with errors in accuracy.
(*k*) Sums and problems are too stereotyped, and too little graduated.

4. In choosing a *style* of writing for teaching, by what considerations would you be influenced ?

Writing should be (*a*) legible, (*b*) easily produced, (*c*) artistic in shape, (*d*) and require no abnormal posture.

It should therefore be (*a*) large, round, unflourished, slightly sloped, uniform, and well-spaced, (*b*) written with few liftings of pen and little bodily exertion, (*c*) conformed to usual canons of calligraphical proportions.

5. The Code prescribes for the English History of Standard IV. a selection of stories and biographies from 1066 to 1485. Construct such a list as you would yourself use for this purpose.

List.	*Object.* To show—
(1) Battle of Hastings.	The commencement of Conquest.
(2) Hereward the Wake.	The smouldering embers of resistance.
(3) Battle of Tenchebrai.	Disunion of Normans and Saxon assistance.
(4) Civil war in Stephen's reign.	Castle life, and the evils of usurpation.
(5) Thomas à Becket.	Power of Church, and English, independence.
(6) Strongbow, Earl of Pembroke.	Commencement of Irish Conquest.
(7) Richard I. and Third Crusade.	Influence of Crusades.
(8) Scene at Runnymede.	Union of Englishmen to secure liberty.
(9) Simon de Montfort.	Origin of House of Commons.
(10) Edward I.	The idea of a United Kingdom (Llewellyn, Wallace).
(11) Bannockburn.	The sturdy Scot.
(12) Black Prince.	Superiority of our yeomen at Creçy, etc.
(13) Wyclif.	The Rise of the Reformation.
(14) Wat Tyler.	The English villein struggling for his rights.
(15) Agincourt.	Usurpation hidden by foreign aggression.
(16) Joan of Arc.	The might of pure patriotism.
(17) Warwick, the King-Maker.	The power of the Barons.
(18) The Princes in the Tower.	The unsettled state of society and morality.
(19) Caxton, the Printer.	Rise of the power of the pen.
(20) Battle of Bosworth.	Conciliation of the Roses.

6. In the maintenance of 'order,' or 'discipline' in its narrower sense, what differences must be observed in dealing with infants and older children respectively ?

In order to rule, a knowledge of the ruled is necessary. Infants differ from older children in having less developed the reasoning faculties, the will, the moral sense. Their instincts are relatively more powerful, their attention must be voluntary, their restlessness is greater, and pleasure more than right must be appealed to.

To preserve good discipline, therefore, lessons must be made attractive, curiosity must be excited, change of position must be frequent, trifling inadvertences must be overlooked, inducement should be substituted for compulsion, reprimand for punishment, and the child's affection appealed to where its moral sense is deficient.

7. In giving an 'object lesson,' for what purpose, and by what means, would you teach children difficult or unfamiliar words ?

Difficult or unfamiliar words should not be unnecessarily introduced in *Object Lessons*. Only such should be employed as are absolutely essential in order to explain or label new ideas, qualities, etc.

Where possible, the idea should be first implanted by actual experience, and then the corresponding term introduced to be inseparably associated with it. The word must not only be pronounced by the teacher, but written on the blackboard and repeated, spelled and explained by the scholars.

8. How would you endeavour to cultivate (*a*) truthfulness, (*b*) cleanliness, in young children?

All good qualities may be cultivated in two ways—by positive assistance, and by repression of the corresponding vice. Prevention is better than cure. In every case we must have (i) the constant example of the teacher in the right direction, (ii) praise of conspicuous right conduct or habits bestowed judiciously upon the earnest scholar, and (iii) suitable punishment for wrong-doing. A sense of order implanted often assists cleanliness, and at times truthfulness.

(*a*) As regards truthfulness, undue severity or doubt must not handicap it. Harshness will banish it, but faith attract it.

(*b*) To induce cleanliness we must have proper school premises well kept. Dirtiness may be often rendered ridiculous.

Occasionally anecdotes (not too 'goody-goody') may be employed to illustrate the value of truthfulness, etc.

9. What purpose is served by the teaching of grammar? Would any other study do equally well? If not, why not?

The great purpose in teaching Grammar is to train the reasoning faculties by exercising them upon abstract rules and principles learned by daily and constant practice.

No rule in Grammar should be arbitrarily imposed, but should be obtained inductively from an accumulation of examples furnished by the scholar himself. Then afterwards deductive reasoning in Analysis and Parsing is exercised in the application of these established rules.

Of course the scholar is also obtaining some knowledge of how to speak and write; but formal teaching of Grammar is not in this direction so valuable as has been supposed.

No other ordinary study would train the reasoning and judgment nearly so well, for none is so purely abstract, so natural, and brings into play such interaction between induction and deduction.

Arithmetic would be the most valuable substitute; but it lends itself too much to mechanical treatment, and the reasons for its processes are often 'too much' for the juvenile mind. Practical skill in Arithmetic can greatly outstrip theory.

10. If you were reading the following passage (from Lord Wolseley's 'Life of Marlborough') with a class of older children, (*a*) what parts would you explain, (*b*) how would you explain them, and (*c*) how would you ascertain whether your explanations had been understood?

'The royal army was now concentrated for the first time during the campaign. Monmouth had been led to hope that many officers of the regular army would have joined him on the borders of Wiltshire, but none came, and his heart fainted within him. He was in despair, and haunted with a dread of assassination, which the offer of £5,000 for his body, dead or alive, caused him to anticipate.'

(*a*) (i) Royal army; (ii) concentrated; (iii) campaign; (iv) Monmouth; (v) regular army; (vi) heart fainted; (vii) in despair; (viii) dread of assassination; (ix) offer of £5,000; (x) to anticipate.

(*b*) (i) Army of James II; (ii) massed together at one centre; (iii) series of military operations; (iv) Duke of Monmouth, cf. Salisbury, Rosebery, etc.; (v) standing army of professional soldiers; (vi) lost all courage; (vii) void of all hope; (viii) fear of being murdered; (ix) an immense bribe in those days; (x) to expect.

(*c*) Ask questions such as following:—(i) Could the present French army be called Royal army; (ii) When are the scholars concentrated? When are one's thoughts concentrated? (iii) What other campaigns can be mentioned? (iv) Name any local nobleman. (v) What are irregular troops? Why so called? What are the volunteers? (vi) Make up such phrases as 'lost heart,' 'were disheartened,' etc. (vii) When did Judas Iscariot, Napoleon, etc., despair? (viii) What does a man value most? Was Monmouth's fear natural? (ix) Was this fear reasonable? (x) Do we anticipate beforehand?

As the class is of older children, the derivation of *royal, concentrated, campaign, regular, despair, assassination, anticipate* should be given. The history of the word *assassination* is peculiarly interesting; and the disguise of *ante* in anticipate is noteworthy.

B.—GEOGRAPHY.

(Thursday, July 5th, 3.15 to 5.)

1. Draw on page 1 of your book (taking a long side of the page for north, and showing lines of latitude and longitude and a scale of miles) as large a map as you can of

EITHER

The boundary between British North America and the United States (omitting Alaska)

OR

That part of Australia which lies south of a direct line from Perth to Brisbane.

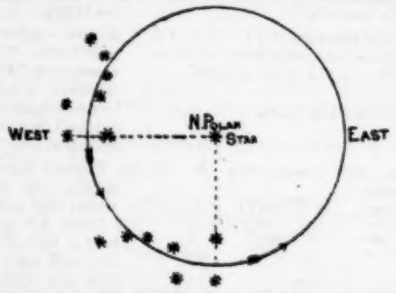
See any respectable Atlas.

2. (*a*) How would you teach a child, on a clear night, to find the North Polar Star?

(*b*) A ship is in latitude 40° 40′ S., and longitude 92° W. Find the latitude and longitude of that point of the earth which is farthest from this ship.

(*c*) *A* travels from Greenwich eastwards for one degree of longitude; *B* travels from Greenwich southwards for one degree of latitude. Which travels furthest, and why?

(*a*) The Great Bear (Ursa Major), the Plough or Charles's Wain, can easily be discerned on a starlight night. It consists of seven distinctly visible stars with an outline roughly similar to a waggon. The two stars denoting the hind wheels are called the 'pointers,' and in a straight line from them about 2½ times their apparent distance apart is the North Polar Star. The diagram shows two positions of the constellation 6 hours apart.



(*b*) The point (P^1) furthest away must be at the Antipodes, and must be just as much North of the Equator as the given point (P) is South. Therefore P^1 is 40° 40′ N. latitude. Again it must be 180° of longitude away or 272° W. longitude which is (360—272)°.

(*c*) A degree of latitude is nearly always constant in length, being about 69 miles. It varies a little as the earth is not a perfect sphere but an oblate spheroid. On the other hand the degree of longitude is not always $\frac{1}{360}$ of a *great* circle, but varies from 69 miles at Equator to nothing at the Poles. Therefore, as Greenwich is not on the Equator, and as the parallel circle on which the longitude is measured is a small circle, a degree of longitude there is less than a degree of latitude.

3. Where are the mouths and the sources of the Rhine, the Rhone, and the Danube? Show with which of these rivers the following lakes are connected, and how:—Brienz, Geneva, Neuchatel, Sils, Wallenstadt, Zürich.

Rivers.	Sources.	Mouths.	Lakes.
(1) RHINE -	Mount St. Gothard, Switzerland.	(1) North Sea; (2) Zuyder Zee.	The River Aar joins the Rhine at Waldshut. It drains *Lake Brienz.* Its tributary the Thiel drains *Lake Neuchatel,* and its tributary the Limmat drains *Lake Wallenstadt* and *Zürich.*
(2) RHONE -	Mount St. Gothard.	Gulf of Lyons	The Rhone flows through *Lake Geneva.*
(3) DANUBE	East of Black Forest Mountains.	Many Mouths debouch into Black Sea N. of the Dobrudscha.	The Inn, a tributary of Danube, flows through *Lake Sils.*

4. Say, as precisely as you can, where each of the following is, and give, as concisely as you can, some *interesting* information about each:—Baku, Barbadoes, Bishop Auckland, Elephanta, Fujiyama, Havana, Hokitika, Samoa, the Yosemite Valley.

Name.	Position, etc.	Interesting Information.
(1) BAKU	Port on Caspian Sea in Trans-Caucasia.	Petroleum wells, seal fishery.
(2) BARBADOES	Most easterly of Windward Isles, West Indies.	*Capital*, Bridgetown, *Exports*, sugar, rum, molasses, coffee, flour.
(3) BISHOP AUCKLAND.	On River Wear, county Durham.	Exports coal.
(4) ELEPHANTA	Small isle near Bombay.	Noted for its famous caves and their carvings and grottoes.
(5) FUJIYAMA	A volcano 14,000 ft. high, S. E. of Nipphon, Japan.	Crater is half a mile across, base 20 miles.
(6) HAVANA	N. W. coast of Cuba	Metropolis, 200,000 inhabitants; burial place of Columbus; Exports, cigars, tobacco, sugar, honey, wax.
(7) HOKITIKA	W. coast of S. Island, New Zealand.	Capital of Westland, no harbour, centre of gold-mining.
(8) SAMOA, or Navigator Isles.	South Pacific	In route from America to Australia; under combined protection of England, Germany and U.S. of America; residence of R. L. Stephenson, the novelist; volcanic origin; subject to cyclones; Exports, coffee, cotton, tobacco, cocoanuts.
(9) YOSEMITE VALLEY	In California, near San Francisco.	Ten miles long; highest waterfall in the world; magnificent precipices, peaks and cliffs.

5. Into what three portions does the peninsula of Hindostan *physically* divide itself? State, very briefly, some physical characteristics of each portion, and name in each portion three towns which are not seaports.

India naturally divides itself into (*a*) *Basin of Indus and E. Desert*, (*b*) *Basin of Ganges*, and (*c*) *the Deccan*.

(*a*) *Basin of Indus, etc.*, stretches from the Arabian Sea to the Himalayas. In the N. and N.W., Cachmire and the Punjab (district of the five rivers Indus, Thelum, Cherab, Ravee, Sutlej) are fruitful and well-watered; whilst in the South, the Desert of Thar and the salt Runn of Cutch are barren. *Towns* are Peshawur, Lahore, Mooltan.

(*b*) *Basin of Ganges* lies between the Himalayas and the Vindhya Hills, and between the Bay of Bengal and the Great Desert. The chief streams are the Goomtee, Gogra, Gunduck, Jumna and Chambul, all tributaries of the main stream. The region is intensely hot and fertile, producing rice, cotton, indigo, sugar and opium, but at the foot of the Himalayas is a swampy belt called the Terai, and at the mouths of the Ganges and Brahmaputra is the Sunderbunds, a jungly marsh. *Towns* are Delhi, Benares, Patna.

(*c*) *The Deccan* is a triangular plateau comprising the whole of India south of the Vindhya and Satpoora Hills, and flanked by the E. and W. Ghats. It is watered by the Mahanuddy, Godavery, Kistnah, and Cauvery, and varies in height from 2,000 to 3,000 feet. The climate, owing to the elevation, is fairly mild, and there is much fertile cotton-growing land, except when droughts render it sterile. *Towns*, *Nagpur*, *Bangalur*, *Mysur*.

6. Write something (about a page if you can) about *one* of the following subjects:—Florida; Greenland; *Korea*; Paraguay; the animals, vegetation, and industries of Tasmania; the Zambesi.

The Corea or Korea, 'The Land of the Morning Calm,' is a kingdom and peninsula about the same size as Great Britain, stretching southward from Manchuria between the Yellow Sea and the Sea of Japan. At the extremity of the peninsula is the volcanic isle of Quelpart. The surface has many fertile portions, and extensive forests of birch, pine, and elm are numerous. The backbone of the peninsula is the Shan Alin Range. The rivers are numerous but comparatively unimportant. On the west coast many good harbours are to be found. The people are of mixed origin, intelligent and industrious, and more friendly to foreigners than the Chinese. The capital is Kin-ke-tao. Gold, silver, copper, lead, and iron are said to be abundant.

At present the country is the scene of a struggle between China and Japan, the events of which are being carefully watched by Great Britain, Russia, and other Powers.

7. Name and describe the position of:—

(*a*) The one chief region where tin is found;
(*b*) The one chief region where platinum is found;
(*c*) The one chief country where coffee is grown;
(*d*) The one chief place, in the eastern hemisphere, where quicksilver is found;
(*e*) The one chief place where diamonds are found.
(*f*) State briefly in what respects the circumstances of Great Britain are peculiarly favourable to manufacture.

(*a*) *Tin.* The one chief region where tin is found is the Straits Settlements at the southern extremity of the Malay Peninsula. The Hartz Mountains in Germany also lays claim to be the principal locality for tin.

(*b*) *Platinum.* The spurs of the Ural Mountains in Asiatic Russia.

(*c*) *Coffee.* Brazil, occupying N. E. and N. centre of S. America.

(*d*) *Quicksilver.* Almaden, a town on northern slope of Sierra Morena in New Castile, Spain.

(*e*) *Diamonds.* Kimberley, capital of West Griqualand in N. of Cape Colony between Orange Free State and the Vaal River.

(*f*) Great Britain's chief manufacturing advantages are:—

(1) Its abundant distribution of coal.
(2) Its ironstone found in proximity to coal.
(3) Its copious supply of water, and its numerous serviceable rivers.
(4) Its splendid harbours open throughout the year.
(5) Its temperate climate, neither too enervating nor too vigorous.
(6) Its population, chiefly of the steady, sturdy Teutonic strain, but rendered more versatile by infusion of Celtic and other bloods.
(7) Its Christianity, government and fiscal policy.
(8) Its enormous and wide-spread colonies.
(9) Its possession of the world's carrying trade.
(10) Its insular position as centre of Land Hemisphere.

8. (*a*) How is Victoria (in Australia) governed?
(*b*) What are the chief sources of wealth?
(*c*) What is the chief source of wealth in New South Wales?
(*d*) Say something about the aboriginal Australians.

(*a*) The Governor of Victoria is appointed by the Crown. The Upper House (or Legislative Council) consists of 48 members elected by ballot by the 14 provinces for six years, 16 of whom retire every two years. The Lower House (or Legislative Assembly, consists of 95 members elected by universal suffrage for three years. The Executive is composed of the Governor and 10 responsible Ministers.

(*b*) The chief sources of the wealth of Victoria are:—

(1) Its goldfields, which have yielded £220,000,000 worth in the last 40 years.
(2) Its 15,000,000 sheep, giving wool, preserved meat, and tallow.
(3) Its agriculture, including fructiculture and viticulture, 1,500,000 gallons of wine are exported.
(4) Its lumbering, eucalyptus, etc.

(*c*) The chief source of wealth in N. S. Wales is grazing, £10,000,000 of wool being exported every year.

(*d*) The aborigines of Australia, about 100,000 in number, mostly to be found in York Peninsula and Queensland, are of the Papuan-negro race. They are medium in stature (5 feet 6 inches), of sooty-brown complexion, with long, matted, uncurly hair. The head is long and narrow, the forehead low, the nose flat and the eyes large. The upper portion of the body is more fully developed than the lower limbs. Their tastes are degraded, their knowledge of civilised arts almost nothing, their religion one of brutish fear, their intellect little above animal instinct. They live in tribes speaking diverse dialects, but many have already died out. Polygamy is universal and women are cruelly treated. In throwing the 'boomerang' they are very skilful.

9. Explain briefly, but in as interesting a way as you can, these terms :—(*a*) Atolls ; (*b*) Cañons (or Canyons) ; (*c*) Selvas ; (*d*) Steppes ; (*e*) Dollar ; (*f*) Rupee ; (*g*) Boer ; (*h*) Mandarin ; (*i*) Buddhist.

(*a*) *Atolls* is the name (of Maldive origin) for the ring-shaped coral isles found in the Indian and Pacific Oceans. Within is a shallow lagoon communicating with the sea by breaks in the band.

(*b*) *Cañons* are profound narrow gorges found in the Rocky Mountains of N. America. The most celebrated is the Grand Cañon, 300 miles long and at places 7,000 feet deep. They have been scooped out by the rivers whilst the sides have not been sloped by aerial denudation, the district being almost rainless.

(*c*) *Selvas* (Latin *silva* = a wood) are the immense wooded plains stretching for hundreds of miles along the Amazon.

(*d*) *Steppes* are vast low-lying plains in S.E. Russia and W. Siberia, having a poor and sometimes sterile soil. Except in spring vegetation is scanty.

(*e*) *Dollar* (German *Thaler*) is a United States coin, nominally worth 4s. 2d., coined both in gold and silver.

(*f*) *Rupee*, a silver coin of British India nominally worth a florin, is now, owing to over production of silver, only valued at 1s. 2d.

(*g*) *Boers* (from Dutch *boer* = a farmer ; *cf.*, also English *boor*, Anglo-Saxon *gebure*, German *bauer*) are the Dutch farmers' descendants of settlers in Cape Colony, who time after time have 'trekked' into the interior from out of British Rule. They now rule the Transvaal, but will soon be outnumbered by the ubiquitous English.

(*h*) *Mandarin* (Portugese *mandarim*, from Latin *mando* = I command) is the title of the highest order of Chinese officials. There are, however, different ranks of Mandarins.

(*i*) *Buddhists* are found chiefly in China and some parts of India. *Buddha* was a teacher of holy life and lofty principles ; but his doctrines have been degraded to cover the filthiest and grossest idolatry. There are more Buddhists than people of any other religion.

10. (*a*) Show how the electric telegraph can be used to calculate longitude.

(*b*) If we had a second moon, exactly like the present one in all respects, and just as far away, but always exactly on the opposite side of the earth from the present moon, how would the tides be affected ?

(*c*) Whereabouts on the earth does the compass needle point due West ?

(*a*) The utilisation of electricity in calculating longitude depends upon its exceeding swiftness. Since the sun is vertical, only once a day it traverses 360° of longitude in 24 hours. Therefore, if we know the difference in time between two places, we know their difference in longitude, one hour equalling 15°. If now when it is noon at Greenwich, the time be wired instantaneously to Montreal, from the difference of time is calculated the W. longitude, Greenwich being 0°. As a matter of fact the transmission is not instantaneous, but the short time occupied is known and added to the time telegraphed. Recently, this calculation was most carefully carried out.

(*b*) According to the theory of the tides, when the sun and moon are in opposition, their attractive force upon the ocean is cumulative, and so also would the case be with the second moon as in the question. Both, therefore, in quadrature and in opposition, the tide would flow higher and consequently ebb lower.

(*c*) The magnetic North Pole is at present about 70° N. latitude in Boothia Felix. At any place therefore of that latitude, and not farther than 180° eastward, the compass will point due west.

11. (*a*) Say what you know about the mouth of the Mississippi River.

(*b*) Explain how it is that many curved lakes are found near this river and other large rivers.

(*a*) The Mississippi enters the sea by many mouths, whose separate volumes of water are not strong enough to bear away the transported mud, amounting to 1,000,000 tons per day, well into the sea. This, therefore, accumulates at the mouth (the delta extends 50 miles into the Bay of Mexico) and gradually blocks up the old channels. The main stream is constantly changing and immense sums of money have continually to be spent in dredging the channel from New Orleans to the sea.

(*b*) As explained above, the old channels of the rivers are constantly being deserted, and these become lakes, curved, as was the course of the stream. The winter and spring floods keep these replenished with water. Near some rivers, curved lakes have been formed by a change of channel caused not by deposits, but by the gnawing away of a peninsula. The river has thus taken a straighter course, and the old winding channel becomes a lake.

12. Show the appropriateness of, or the reason for, the following names, stating what and where are the things named :—(*a*) Alexandria ; (*b*) Barmouth ; (*c*) the Bras d'Or ; (*d*) Chester ; (*e*) Colorado States ; (*f*) Costa Rica ; (*g*) the Lakhadives ; (*h*) Natal ; (*i*) New Guinea ; (*j*) the Rio Grande del Norte ; (*k*) Stanley Pool ; (*l*) Strathspey ; (*m*) Tananarivo ; (*n*) Wady Halfa.

Name.	What and Where.	Reason for Name.
(*a*) ALEXANDRIA.	Port, 170,000 population, on western mouth of Nile.	The 'old town' was founded by Alexander the Great.
(*b*) BARMOUTH	Watering place at mouth of Mawddach in Merionethshire.	*Bar* at *mouth* of river, OR *Abermaw* (*Aber* = mouth of) contracted to *Bermaw*, *Barmouth*.
(*c*) BRAS D'OR	A fiord almost bisecting Cape Breton I.	*Bras d'Or* = Arm of Gold. The isthmus wherein gold was found was first thus called.
(*d*) CHESTER	County town of Chester, on the Dee.	An important Roman station. Latin, *castra* = camp. Cf. Winchester, Worcester, Caistor, etc.
(*e*) COLORADO STATE.	W. central state in N. American Union.	Drained by Colorado, a reddish-coloured river. Spanish, *colorar* = to colour.
(*f*) COSTA RICA.	Small, fertile, flourishing state in Central America stretching across from ocean to ocean.	*Costa Rica* = Rich Coast, so called from the profuse golden ornaments of the natives when discovered by Spaniards.
(*g*) LAKHADIVES.	A dense group of isles lying 300 miles off Malabar Coast of India.	So called by natives, *lakha* = 100,000; *divipa* = *isles*.
(*h*) NATAL	British Colony, N.E. of Cape Colony.	Discovered by Vasco da Gama on Christmas Day—our Lord's *natal* day—1497.
(*i*) NEW GUINEA.	Largest island in the world (exclusive of continents), N. of Queensland.	Similarity in gold producing, coast, climate, etc., to Guinea in W. Africa.
(*j*) RIO GRANDE DEL NORTE.	Large river between Mexico and Texas.	Literally '*Great River of the North*,' so called by the Spaniards of Mexico.
(*k*) STANLEY POOL.	A lake upon the Congo, just above the cataracts, and 250 miles from its mouth. On it stands Leopoldville.	Discovered by Stanley in 1877.
(*l*) STRATHSPEY.	The valley of the Spey (also a town) in Elgin, N. E. Scotland.	*Strath* = broad river valley. Cf. Strathclyde.
(*m*) TANANARIVO.	Capital of Madagascar, population 100,000, on high-central table-land ; a collection of numerous small villages.	The name means '1,000 towns.'
(*n*) WADY HALFA.	The frontier post of Egyptian Government to the South, about a mile north of the second cataract of the Nile (22° N.).	*Wady* = valley of occasionally dry stream. Cf. Guadalquivir. *Halfa* = reeds.

N.B.—Rev. Isaac Taylor's '*Words and Places*,' published by Macmillan, is the *Standard* work for such information as the above.

13. Give instances from the following parts of the earth, of changes in the earth's surface, which have taken place since man's appearance, but not by man's agency :—

(*a*) The South Coast of England ;
(*b*) New Zealand ;
(*c*) China ;
(*d*) Scandinavia.
(*e*) Explain the term 'continental shelf.'

(*a*) (1) The Goodwin Sands have been formed from land.
(2) Sandwich, Hythe, Winchelsea, formerly ports, are now some distance inland.
(3) Portions of these near Dover have receded about a mile and a half during last 18 centuries.
(4) Marked denudation has occurred along coasts of Sussex, Devon, Cornwall.
(5) The site of London was a lagoon studded with isles.
(6) Thanet was an island.

N.B.—See Taylor's '*Words and Places*,' Chapter XIV.

(*b*) Tarawera or Rotaura, a volcano of N. Island, supposed to be extinct, became in 1886 suddenly active ; the famous mineral spring Tetarata disappeared, and a mud volcano arose. Many villages were overwhelmed, 400 square miles of fertile territory was devastated, and the celebrated 'Pink and White Terraces' (see Froude's 'Oceana'), formed by centuries of silicious deposit, were destroyed.

(*c*) The River Hoang-ho has within the memory of man destroyed its embankments nine or ten times. This mighty stream flows through a plain of soft yellow earth, offering little impediment to a change of course.

Thirty-three years ago it formed a lake about 8,000 square miles in area, and abandoning its old channel to the Yellow Sea, flowed into the Gulf of Pi-chi-li.

(*d*) The whole of northern Scandinavia is slowly rising, at the rate of 5½ feet per century on the east, and somewhat more slowly on the west. The extreme south is, however, undergoing depression.

(*e*) On the coasts of continents transverse to their mountain axes, a comparatively shallow fringe of sea is found. One of the best instances is that of Europe, where the continental shelf stretches west of Ireland for several hundred miles.

SELECTED GOVERNMENT QUESTIONS.

First Week.

1. Write a short essay on one of these subjects :—
(1) The snowstorm in March 1891 ; or
(2) Fruit trees ; or
(3) The Census.

2. Analyse fully the following lines, and parse the words printed in italics :—

'*Tis* morn, but scarce *yon* level sun
Can pierce the war clouds' *rolling dun*,
Where furious Frank and fiery Hun
Shout in their sulphurous canopy.

Few, few *shall part* where many meet,
The snow shall be *their winding sheet*,
And every turf beneath their feet
Shall be a soldier's sepulchre.

3. Paraphrase the following passage :—

In misery's darkest cavern known,
His useful care was ever nigh,
Where hopeless anguish poured his groan,
And lonely want retired to die.

His virtues walked their narrow round,
Nor made a panse, nor left a void ;
And sure the Eternal Master found
The single talent well employed.

4. State the requirements of the Code under the head of 'English' in Standard III., and show how the lessons may be utilised so as to teach the children to frame sentences and speak correctly.

5. From each of the words 'joy,' 'glory,' 'true,' 'wise,' form three other words by the addition of a suffix, introducing each word into a short sentence.

6. Explain as to Standard VI. the meaning of a 'noun sentence,' and write four short passages each containing one.

7. What do you mean by the 'Comparison of Adjectives?' When ought the comparative and when the superlative form to be used? What classes of adjectives do not admit of comparison?

8. In what manner does a relative pronoun resemble a conjunction? How would you distinguish one from the other?

9. Explain the meaning and the grammar of the word *but* in each of the following sentences :—

(*a*) There is no man here *but* honours you.
(*b*) *But* yesterday, the word of Cæsar might
Have stood against the world.
(*c*) He came, *but* did not remain long.
(*d*) Life has passed
With me *but* roughly since I saw thee last.
(*e*) No tongue *but* Hubert's.

10. Say what you know of any two of these writers :—Bacon, Johnson, Pope, Macaulay—and what books they wrote.

Second Week.

1. Classify Adjectives. How are they inflected? How would you parse the word *white* in the sentence 'I painted my house *white*.'

2. Give a short historical sketch, with dates, of the origin and growth of the English language.

3. Say what you know about each of the undermentioned places:—Aden, Florence, the Campagna, Granada, the Deccan, the Fens, the Black Country, the Peak, Londonderry, the Trossachs, Coventry, and Plymouth.

4. Explain briefly the terms: *inferior planet, phases of the moon, perigee, morning star, neap tides ;* and draw diagrams illustrating the second and last.

5. What are the commonest faults found in the reading of children? How would you correct those faults?

6. State the requirements of the Code in the Geography of the Fourth and Fifth Standards, and say how Geography may be made useful and interesting to children.

7. State briefly of each of the following (*a*) When he lived ; (*b*) With what political or social questions his name is associated :—*Milton, Locke, Hume, Clarendon, Burnet, Burke, Cobden, Dr. Arnold, Howard.*

8. Explain the terms *King's Friends, Roundheads, Regicides, Pilgrim Fathers, the Cabal.* Name the reigns to the history of which each belongs.

9. Write the scale of E♭ Major.

(*For Sol-faists.*) Describe the mental effects of Fah, Te, Me.

10. Two gallons of a mixture of spirit and water contain 12 per cent. of water, and are added to three gallons of another mixture containing 7 per cent. of water ; to the whole is then added half a gallon of water. Find the percentage of water in the resulting mixture. Ans. $17\frac{1}{11}$ per cent.

11. Give Notes of a Lesson on Long Division.

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13. (*Men only.*) Write out Euclid I. 4.

ABCD is a square, ABE an equilateral triangle. If EC, ED be drawn, the triangle DEC is isosceles. It may be assumed that an equilateral triangle is also equitangular.

(*Women only.*) What are the chief sources of English unthrift in Cookery?

14. (*Men only.*) Write out Euclid II. 5.

From the vertex of an isosceles triangle a line is drawn to any point in the base. The square on a side of the triangle is equal to the square on the line so drawn together with the rectangle contained by the segments into which the base is divided.

(*Women only.*) What dangers to health are likely to accrue in a school where there are no lobbies or porches for clothes, and where the desks are flat, and occupy nearly all the floor space, and face the windows?

15. (*Men only.*) The circumference of a circular field is 252 yards. If the field be worth £48 16s., find the value of a similar circular field whose circumference is 315 yards. Ans. £76 5s.

(*Women only.*) Give the materials, with quantities, for a plum pudding for a family of six.

16. (*Men only.*) Solve $\frac{ax^2+bx+c}{px^2+qx+r}=\frac{ax+b}{px+q}$.

Ans. $\frac{rb-cq}{pc-ra}$.

17. (*Men only.*) The length of a field is twice its breadth. Another field, which is 50 yards longer and 10 yards broader, contains 6,800 square yards more than the former. Find the size of each. Ans. 90 yards by 180 yards, and 100 yards by 230 yards.

Third Week.

1. (*a*) *Prove* the rule for Multiplication when the multiplier is a number larger than 12 :—(*e.g.*, 3219 × 629).

(*b*) *Prove*, as to a class of beginners in the rule, that the Least Common Multiple of 12, 28, and 42, is 84.

(*c*) *Prove* the rule for reducing a fraction of any denomination to a fraction of another denomination:—(*e.g.*, to reduce 3s. 7½d. to the fraction of 12s. 8¼d). Why is not the answer in money?

(*d*) *Prove* the rule for finding the simple interest of a given sum at a given rate per cent. per annum. (£275 for 3 years at 7 per cent. per annum.)

2. The cost price of an article is £2 12s. 6d. per ton ; the selling price is £2 18s. 9d. per ton ; how many tons must be sold to gain £9 5s. 11½d.?

3. Find, by Practice, the cost of 2 acres 3 roods 21 sq. poles 2¾ sq. yards at £53 3s. 4d. per acre.

4. A partner in a business is entitled to ⅘ of the profits ; what were the average annual profits when his share for 2½ years was £1,010 17s. 9d.?

5. Reduce $\frac{33}{91}$ of $\frac{13}{33}$ of £2 12s. 1d. + $\frac{44}{45}$ of $\frac{84}{176}$ of £5 13s. 9d. to the fraction of £11 6s. 11d.

6. Find the value of 6·9375 cwt. + ·35 of 2 qrs. 14 lbs. + ·0421875 of a ton.

7. A can do ⅓ of a piece of work in 2 hours ; B can do ⅔ of the remainder in half-an-hour ; C can then finish it in 2 hours. How long would A, B, and C together take to do it?

8. Find a fourth proportional to ·0427, ·38, and 12·87.

9. A man left £36,288 to be divided between his two sons in proportion to their ages at the time of his death, which were 19 and 23 years; what sum did each receive? What difference would it have made to each if the father had lived 3 years longer?

10. If a man receives on a fourth of his capital 3 per cent., on two-thirds 5 per cent., on the remainder 11 per cent., what percentage does he receive on the whole?

11. If the wages of 37 men for 27 days are £233 2s., what will be the wages of 42 men for 45 days at the same rate?

12. The present worth of £1,321 15s., due in 2½ years, is £1,244 ; find the rate per cent. per annum simple interest.

13. Find the exact compound interest on £3,456 for 3 years at 4 per cent. per annum.

14. What sum must be invested in a four per cent. stock at 113 to produce an income of £240 6s. 8d.? (Neglect brokerage.)

Answers.

1. (*a*) 2024751 ; (*b*) 84 ; (*c*) ⅔ ; (*d*) £57 15s.
2. 29⅔.
3. £153 4s. 4d.
4. £974 15s. 8½d.
5. ⅔.
6. 8 cwt.
7. 1½ hrs.
8. 200.
9. £216.
10. 5⅚.
11. £441.
12. 2½%.
13. £431 10s. 7·19616d.
14. £6,789 8s. 4d.

Fourth Week.

1. Write a short essay upon *Temperate Habits.*

2. Paraphrase the following:—

'Our bugles sang truce, for the night-cloud had lowered,
And the sentinel stars set their watch in the sky,
And thousands had sunk on the ground overpowered,
The weary to sleep and the wounded to die.

'When reposing that night on my pallet of straw,
By the wolf-scaring faggot that guarded the slain,
At the dead of the night a sweet vision I saw,
And thrice ere the morning I dreamt it again.'

3. Write notes of a Lesson on one of these cities: New York, Quebec, San Francisco.

4. What is the '*Solar System*'? Draw a diagram to illustrate your answer.

5. Enumerate the North American rivers that flow into the Pacific Ocean. Where and what are the cañons?

6. What are the best expedients you know for quickening and securing the attention of a languid or disorderly class?

7. '*The answers given by children are too often confined to single words.*' Why is this objectionable, and what means can be adopted to encourage children to make complete statements?

8. Name, in order, the chief victories of Nelson. Give a short account of the battle of Trafalgar and its political results.

9. Name the statesmen and philanthropists of the reign of George the Third who aimed at the abolition of the slave trade. How was this infamous traffic carried on?

10. Write the signatures of B♭ Major, D Minor, A Major, B Minor, OR, What is the name for *ray* sharp, *lah* flat, *soh* sharp, and *me* flat?

11. Write out the air of *either* 'RULE BRITANNIA' *or* 'THE OLD HUNDRED.'

12. If I invest £9,975 in the Three-and-a-Half per Cents. at 99¾, what annual income shall I receive? Ans. £350.

13. £52 18s. is made up of half-sovereigns, half-crowns, and sixpences in the proportion of 3, 5, 7. How many coins are there? Ans. 345.

14. (*Men only.*) Write out Euclid I. 13. The bisectors of the adjacent angles which one straight line makes with another are at right angles to each other.

(*Women only.*) State the special points which should be attended to in teaching *hemming*, *sewing*, *stitching*, and *setting in* to girls.

15. (*Men only.*) Write out Euclid II. 7. If a straight line, AB, be divided into any two parts at C, and AC be divided into any two parts at D, the squares on BC, CA, AB are together double of the three rectangles BC.BD and CA.CD and AB.AD.

(*Women only.*) What would you do before the doctor came if a child in your school (*a*) was badly scalded, (*b*) had fainted, (*c*) had cut his arm above the elbow?

16. (*Men only.*) An equilateral triangle and a square have the same area. Compare their perimeters.

Ans. Perimeter of triangle is 1·14 times that of the square.

(*Women only.*) Give an account of the price, material, colour, and making-up of a neat dress for your own summer wear in school, and say how it should be washed and worn, so as to last as long as possible.

17. (*Men only.*) In a certain proper fraction the difference between the numerator and the denominator is 12, and if each be increased by 5, the fraction becomes equal to ¾. Find it.

Ans. $\frac{11}{23}$.

(*Women only.*) What mode of investing her future savings do you consider the best for a young woman entering on her career as a schoolmistress? State what you know respecting some of the methods of investment now available for small savings.

SCHOLARSHIP OR FOURTH YEAR ROUTINE FOR OCTOBER, 1894.

DAYS	FIRST WEEK			SECOND WEEK				THIRD WEEK				FOURTH WEEK		
	I.	II.	III.	I.	II.	III.		I.	II.	III.		I.	II.	III.
MONDAY	Brackets of Algebra (Theory and Practice) — Theoretical Needlework	History from 1867 to present time	'De Bello Gallico,' Chapters 1 to 10 or 'La Jeune Sibérienne,' pp. 66 to 70	Symbolical Expressions of Algebra — Ingredients of Food	Dates from 1856 to present time	'De Bello Gallico,' Chapters 11 to 20 or 'La Jeune Sibérienne,' pp. 70 to 75	Writing, Repetition, etc.	Fractional Simple Equations — Rules of Health	History from 1603 to 1637	Latin or French Grammar	Examination (Two Hours)	Algebraic Factors — Miscellaneous Geography	Dates from 1603 to 1660	'De Bello Gallico,' Chapters 21 to 30 or 'La Jeune Sibérienne,' pp. 5 to 20
TUESDAY	Euclid, Book I. — Diagram of Chemise	Political Geography of North America	English Grammar from Text Book	First Seven Propositions of Euclid, Book II. — Flannel Sampler	General Geography of Europe	English Grammar from Text Book	Definitions, Postulates, Axioms of Euclid, Book I. — Calico Sampler	Political Geography of New Zealand	Revise 'De Bello Gallico' or 'La Jeune Sibérienne'	First Sixteen Propositions of Euclid, Book I. — Diagram of Drawers	Political Geography of remainder of Polynesia	Averages and Percentages		
WEDNESDAY	Parsing and Analysis	Music. All the Minor Scales and Signatures, Common Musical Terms or Chromatic Intervals Common Musical Terms	How to teach Geography	Compound Proportion	Paraphrasing and Repetition	Map of Northern Scotland	Discount	Paraphrasing and Repetition	How to teach Mental Arithmetic	Theory of the Four Simple Rules	Parsing and Analysis	How to teach Composition		
THURSDAY	Simple Equations — Savings and Investments	History from 1625 to 1640	Map of Cape Colony	Problems in Simple Equations — Preparation of Food	History from 1640 to 1643	Parsing and Analysis	Algebraic H.C.F. and L.C.P. — Clothing and Washing	History from 1643 to 1650	Table of English Literature	Problems in Simple Equations — Miscellaneous Geography	History from 1650 to 1660	Map of England N. of Thames		
FRIDAY	Deductions upon Euclid, Book II. — Calico Sampler	Political Geography of South America	Theory of Practice and Proportion	Study any Notes on Euclid, Book I. — Diagram of Flannel Petticoat	Map of Southern England	Stocks	Euclid, Book II. — Flannel Sampler	Political Geography of Australia	Map of Ireland	Algebraic Formulæ of Euclid, Book II. — Any Needlework	Map of Wales	Commercial Geography of our Empire		
SATURDAY	Writing, Repetition, etc.	Latin or French Grammar	Examination (Two Hours)	Any Geography	Latin or French Grammar	Examination (Two Hours)	Writing, Repetition, etc.	Cube Root or Socks	Examination (Two Hours)	Commercial Geography of our Empire	Latin or French Grammar	Examination (Two Hours)		

18. (*Men only.*) Criticise these equations.

$$(a)\quad \begin{aligned} x + 2y - 3z &= 6 \\ 2x + 4y - 7z &= 9 \\ 3x - y - 5z &= 8 \end{aligned}$$

$$(b)\quad \begin{aligned} x + 2y + 3z &= 4 \\ 2x + 3y + 4z &= 6 \\ 3x + 4y + 5z &= 8 \end{aligned}$$

A CORRECTION.

Question 8 (Scholarship Algebra), p. 108, Column 2, August PRACTICAL TEACHER.

Two men start at the same time to meet each other from places 36 miles apart. One takes 3 minutes longer than the other to walk a mile, and they meet in 4 hours. How fast does each walk?

Let x = Time in min. for 1st to walk 1 mile.

Then $x + 3$ = ,, ,, ,, 2nd ,, 1 ,,

As they meet in 4 hours, they are each walking 240 mins.

Hence $\frac{240}{x}$ = number of miles walked by 1st man.

Also $\frac{240}{x+3}$ = ,, ,, ,, 2nd ,,

$$\therefore \frac{240}{x} + \frac{240}{x+3} = 36.$$

$$\therefore 240(x+3) + 240x = 36x(x+3)$$

$$= 240x + 720 + 240x = 36x^2 + 108x$$

$$36x^2 - 372x = 720,$$

$$x^2 - \frac{31}{3}x = 20,$$

$$\therefore x = 12,$$

$$\therefore x + 3 = 15,$$

1st walks 1 mile in 12 mins.,

$\therefore$ in 60 min. he walks 5 miles an hour.

2nd walks 4 miles an hour.

Ans. 5 and 4.

With G. Beach's grateful acknowledgments to Messrs. Hayward (Bollington), Northcop (Chelsea), Hastings (Edgbaston), and S. T. (Norwich).

EXERCISES IN FRENCH FOR CERTIFICATE EXAMINATION.

I.—NOTES ON FRENCH-ENGLISH SIGHT-TESTS.

The following are notes on, and translations of, the italicised passages in the French-English sight-tests set in the September number of the PRACTICAL TEACHER, to which the student is recommended to refer for the context:—

I.—*First Year Students.*

A.—(i.) *Il n'y a rien là d'étonnant* = There is nothing surprising in that.

Note that the adjective *étonnant* is preceded by *de*; this is always the case when the adjective qualifies an indefinite pronoun such as *rien, quelque chose.*

D'un rivage à l'autre = from one coast to *a*nother.

Que l'on croirait creusé = which one (or *you*, indefinite) might think was dug out.

Note the *l'* euphonic placed before *on* after the words *que, où, ou, si,* and *et.* This *l'* is not used generally when the article or pronoun *le* or *la* occurs near *on.*

On même moins = or even less.

Nous sommes là regardant et regardés = we are there beholding and beholden.

Note: Regardant is *singular* and regardés *plural*, although both words qualify the same word *nous.* This is because the present participle is invariable when a true participle, and the passive participle always agrees in number and gender with some substantive.

(ii.) *Aucune magnificence de coloris ne saurait compenser à mes yeux la laideur de la forme* = No magnificence of colour can in my eyes make up for ugliness of form.

Note (*a*) that *aucun, rien, nul, personne, jamais,* when beginning a sentence, require a negative verb to follow; (*b*) that *saurait* (the conditional present of *savoir*) is used idiomatically with a present meaning equivalent to our *can.*

Par conséquent or *en conséquence* = consequently.

La femme qu'il était censé représenter était debout à côté de moi = The woman it was thought to represent was standing by my side.

Note that there is no one word in French for *to stand.* It is translated by *se tenir debout* (to hold oneself upright), and our *standing* is, as here, translated by *debout*, an adverb.

Une caricature ridée de vingt ans plus vieille que le modèle = A wrinkled caricature twenty years older than the model.

Note: The French say *older by* 20 *years.*

(iii.) *En se plaçant la main droite* = placing his right hand.

Note: (*a*) Instead of using the possessive adjective before names of parts of the body, the French generally use the dative of the pronoun placed before the verb. Here, as he placed his *own* hand, the *reflexive* pronoun *se* is used. Literally the translation of this passage is 'In (or while) to himself placing the right hand.' (*b*) That the *cedilla* is always used in the conjugation of verbs ending in *-cer* before the letters *a* and *o.*

De s'asseoir à la turque = To sit down in Turkish fashion.

Ce qui, soit dit comme renseignement = Which is, let it be said for the information, etc.

Note: (*a*) When *which* refers to a preceding *phrase* instead of a noun or pronoun, it must be translated by *ce qui.* (*b*) That *soit* is the 3rd sing. of the Imperative (or Subjunctive used *optatively*) = *let it be.*

Il est d'usage = it is customary.

De la même manière qu'auparavant = In the same way as before.

Note (*a*) that *de* is always used to translate our *in* used with the words way or manner; (*b*) that *auparavant*, not *avant*, is the word with which to translate *before* when an *adverb.*

(iv.) *Telle que jamais enfants n'eurent le malheur d'en perdre une plus tendre* = Such as children never had the misfortune to lose a more tender one.

Note the *en* before *perdre.* In French our *one* qualified by an adjective cannot be literally translated. The French say 'a more tender *of them*,' *i.e.*, the *one* is translated by placing the *genitive pronoun en* before the verb.

Qui me corrigea peu à peu des plus pernicieux = Who reclaimed me gradually from the most pernicious (defects).

Note that *de* instead of *des* plus pernicieux would be the partitive article = some.

(v.) *Qui m'a fait écrire ce papier* = Which has made me write this paper.

Note that this *me* is the *dative* of agent, and that *écrire* has a *passive* signification after *faire.* More literally translated this phrase = 'which has caused to be written by me this paper.' *E.g.*, if we had to translate 'Which has caused *him* to write this paper,' we must express it thus with the *dative* pronoun: 'Qui *lui* a fait écrire ce papier.' This is a very important idiom.

Vos ennemis en seront réduits = Your enemies will *thereby* be reduced.

Note this idiomatic use of *en* = thereby, on this account.

Que votre Altesse puisse jouir de cette sécurité = May your Highness be able to enjoy this security.

Note that *jouir* is intransitive and requires *de* with its complement.

C'est le seul point sur lequel toutes les sectes et factions soient unies = This is the only point on which all sects and factions are united.

Note that the verb *soient unies* is subjunctive. Why? Because it occurs in an adjective sentence qualifying a noun (*point*) very narrowly limited; this is almost always the case when the antecedent is qualified by *a superlative adjective* or by the word *seul.* (For another example see Second Year Students' notes below under number (iv.)

By what rule for the agreement of participles is *unies* feminine plural?

(vi.) *Tout en méritant* = 'Whilst meriting,' or 'all the while that she merited.'

Par celles dont elle se donnait les apparences = By those of which she assumed the appearances.

Peu de souverains anglais sont montés sur le trône = Few English sovereigns have mounted the throne.

Note that *monter* is an intransitive verb of motion which conjugates with *être*; and that therefore the participle agrees with the nominative.

Avec un succès et un bonheur si uniformes = With so uniform a success and good fortune.

Note that *uniformes* is *plural*, although *succès* and *bonheur* are each *singular.* The reason is that *uniformes* qualifies them both.

II.—*Second Year Students.*

(i.) *Comme j'avais effectivement assez bonne opinion du savoir-faire de mon fils* = As I had indeed a pretty good opinion of the business faculty of my son.

À lui nettoyer ses boucles = In brightening his buckles for him.

La satisfaction de le voir enfourché sur le poulain, flanqué d'une botte de sapin = The satisfaction of seeing him astride the colt with a fir-wood box by his side.

Était trop bon encore pour être mis de côté = Was still too good to be put on one side (or *to be thrown away*).

(ii.) *Leurs masses serrées se ruèrent sur les flancs* = Their serried (closely packed) masses rushed on the flanks.

Les légionnaires que gêneraient leurs fardeaux = The legionaries whom their burdens (or *impedimenta*) would hamper.

Note that *que* could not possibly be the nominative of *gêneraient*, and that the French often bring the verb close to the objective or the conjunction *que*, and place the subject *after* the verb.

Arminius encourageait ses compatriotes de la voix = Arminius cheered his fellow-countrymen with his voice. Be careful in the conjugation of verbs in *-ger* to insert a mute *e* after *g* before *a* and *o*.

(iii.) *Qui se sont développés* = Which have developed themselves (or *been developed*.)

Note that reflexive verbs conjugate with *être*, and that the participle agrees with the reflexive pronoun *se* if it be the *direct object*.

Pour l'en enrichir à tout jamais = To enrich it thereby for all time.

Note this use of *en* = *thereby*.

À devenir en quelque sorte le commun héritage de tous = To become in a certain sense the common inheritance of all men.

(iv.) *C'est la seule école où les insensés veuillent s'instruire* = That is the only school in which fools are willing to be instructed.

Note (*a*) the subjunctive used in the adjective clause qualifying a noun qualified by *seul*. This is fully explained above in the note on First Year Students' Tests (v.), *C'est le seul point*, etc.

'*Qui ne veut pas être conseillé ne peut être secouru*' = He who will not take advice cannot be helped.

Note that in proverbial expressions *qui* instead of *celui qui* is used for 'he who.'

Elle ne manquera pas de vous donner sur les doigts = She will not fail to rap your knuckles.

Note this example of the dative of possession, *vous*, before the verb, instead of the possessive adjective before *doigts*. This is usually the case with the names of parts of the body.

(v.) *Parcs à allées droites et à arbres taillés* = Parks with straight walks and trimmed trees.

Note (*a*) this use of *à* in descriptive prepositional phrases; (*b*) that *à* and *de* are repeated before each complement.

Le regard va droit devant soi à perte de vue = The outlook stretches straight before you as far as the eye can see.

Note that *soi* is the objective form of the indefinite pronoun *on*.

Des chênes séculaires = Oaks centuries old.

La vie éclate et abonde de toutes parts = Life bursts forth and luxuriates in every direction.

(vi.) *D'en faire ce qu'il lui plaît* = to do with them whatever he pleases.

Note that *il* here is impersonal.

Sans qu'aucun remords pénètre = Without any remorse penetrating.

Note that most French prepositions can become conjunctions by the addition of *que*. *Pénètre* is subjunctive.

II.—Translation of English-French Sight-Tests.

The following are translations of, and notes on, the passages set for translation into French in the September number of the Practical Teacher :—

I.—*First Year Students.*

(i.) Il *avait vendu* le cheval, il paraît, et se promenait dans la foire en *en* cherchant un autre. Un individu à l'air clérical l'avait conduit à une tente, sous prétexte qu'il *en* avait un à vendre.

Note: (*a*) The pluperfect tense is used and not the past anterior, except after conjunctions of time and phrases commencing with *à peine*, *jamais*, etc. (*b*) That *en* (= of them) must precede the verb when in English we can supply the words 'of them,' *e.g.*, another *of them*; one *of them*. (*c*) The attributive gerundial infinitive is preceded by *à* (*à vendre*).

(ii.) Un ami du doyen Swift lui envoya un jour un turbot *en présent* par un jeune domestique qui avait souvent fait *de semblables commissions*, sans jamais recevoir la *moindre* marque de générosité de la part du doyen.

Note: (*a*) *En* translates *as* = *in the capacity of*. (*b*) Why *de* and not *des* before *semblables commissions?* Because an adjective intervenes between the partitive article and the noun. (*c*) Be careful not to confound *moindre* (adj.) with *moins* (adv.)

(iii.) Elle occupe généralement deux chambres, *tenues* avec le plus grand ordre possible. Dans la chambre *à coucher* est un lit avec une courte-pointe blanche, et avec des rideaux d'un dessin pastoral qui consiste alternativement dans de grandes plantes et dans *des bergers et bergères*.

Note (*a*) *à coucher*, another example of the attributive use of the gerundial infinitive, which is preceded by *à*.

(iv.) Ses contemporains nous parlent de son extérieur imposant, *de* son port distingué, *de* son air d'autorité, *de* son œil plein de feu et *des* accents persuasifs de sa voix.

Note the preposition *de* repeated before each object, and the omission of the definite article before *autorité* because used adjectively.

(v.) J'ai été fort surpris hier d'entendre mon *vieil* ami, au milieu du service, crier tout haut à un certain John Matthews de *prendre garde à lui* et de *ne pas* troubler la congrégation.

Note: (*a*) The euphonic form of vieux (viz. *vieil*) must be used before a word beginning with a vowel or silent *h*. (*b*) That both portions of the negative *ne pas* are placed before an *infinitive;* the infinitive verb does not separate them usually.

(vi.) C'était sur la force, sur la force brutale seule qu'il s'appuyait. Il avait été élevé *en* soldat, accoutumé *de bonne heure* à la rude discipline du camp. La seule loi qu'il *reconnût* était la loi martiale —son seul argument, l'épée.

Note: (*a*) *en* = as = in the capacity of. (*b*) early = *de bonne heure*. (*c*) the use of the subjunctive *reconnût* in an adjective sentence qualifying a word which is qualified by *seul*, or by an adjective in the superlative degree. This is explained and illustrated above. But *appuyait* is *indicative*, because the sentence in which it occurs is not *adjectival* but *substantival*.

II.—*Second Year Students.*

(i.) C'est ici que la vieille dame reçoit quelques visiteurs tranquilles qui *viennent prendre* le thé et peut-être faire une partie de cartes de bonne heure dans la soirée ; ou vous pouvez la voir sortir pour *aller faire* elle-même une visite de la même espèce, *munie* d'un léger parapluie allongé en forme de canne.

Note: Our *come and do*, *go and do* are translated by *venir* and *aller* respectively, followed by *an infinitive without a preposition;* thus *viennent prendre ; aller faire*.

(ii.) Si le souper était de mon goût, la bénédiction qui le suivit *le fut encore davantage*. Le souper fini, le vieillard frappa sur la table avec le manche de son couteau, pour leur dire de s'apprêter pour la danse. Aussitôt le signal donné, les femmes et les jeunes filles coururent toutes ensemble dans une arrière-pièce *pour* se nouer les cheveux, tandis que les jeunes hommes *coururent se laver* la figure à la porte.

Note: (*a*) The neuter pronoun *le* translates English *so* used pronominally almost equivalent to *it ;* (*b*) that *davantage* translates *more* used absolutely or without the word it qualifies coming next to it. (*c*) That *pour* precedes the *infinitive of purpose ;* the *se laver* after *coururent* does not show sufficient purpose to justify the use of *pour*.

(iii.) Bayard mourut malgré leurs soins, comme *étaient* morts ses ancêtres, depuis plusieurs générations, sur le champ de bataille. Pescara fit embaumer son corps et l'envoya à sa famille ; et telle était le respect que l'on portait au mérite militaire à cette époque, que le duc de Savoie voulut que ses restes fussent reçues dans toutes les villes de ses états avec les honneurs réservés aux rois.

Note (*a*) that *mourir* conjugates with *être ;* (*b*) that the subordinate clause following *vouloir* requires the subjunctive.

(iv.) Quand Colomb était venu se placer devant cette savante assemblée, on n'avait vu en lui que le simple navigateur, un peu intimidé, peut-être, par la grandeur de sa tâche et par l'auguste caractère de son auditoire ; mais il était animé d'une fervente piété *qui lui inspirait de la confiance* dans l'execution de ce qu'il considérait comme sa haute mission.

Note: In French they say '*to inspire confidence to someone*' whereas we say '*to inspire someone with confidence.*'

(v.) De ce que (or *Parce que*) l'éducation est tout intérieure, elle n'*en* est pas moins nécessaire, et ce n'est pas un devoir plus impérieux pour l'homme de *faire instruire* son enfant que de s'instruire lui-même. L'indolence peut l'entraîner à négliger cet examen intérieur et ces épreuves qui constituent son école, et l'ennui peut le porter à se soustraire *aux* exercices nécessaires.

Note: (*a*) *en* = on that account, therefore. (*b*) Be careful to distinguish *have* as an *auxilary* from *have* as a *principal* verb equivalent to *cause* or *make*. In the latter case it must be translated by *faire*, which often translates our *get*; *e.g.*, 'Get the water boiled,' '*Faites bouillir l'eau.*' (*c*) That verbs of *deprivation*, e.g., *soustraire*, take *à* with their complements.

(vi.) Il méritait certainement de réussir, car je n'ai jamais vu personne qui *fût* si désireux de se *rendre* agréable. Tout le monde semblait le *connaître*, et il ôtait aussi scrupuleusement son chapeau au paysan qui revenait de son travail, qu'aux messieurs qui nous passaient dans leurs cabriolets.

Note: (*a*) *Fût* is subjunctive because in an adjective sentence qualifying an indefinite pronoun, *ne personne*. (*b*) *Rendre* translates *make* when followed by a factitive adjective. (*c*) *Connaître* for knowing an *individual*, *savoir* for a *fact*.

A.—French-English Sight-Tests for November.

In the November number of the Practical Teacher the italicised portions will be translated and grammatical explanations and hints given bearing on these passages.

I.—*First Year Students.*

(i.) Comme ils ne faisaient aucun commerce au dehors, ils n'avaient besoin d'aucune monnaie. Ils sont presque tous bergers ou laboureurs. On voit en ce pays peu d'artisans; car *ils ne veulent souffrir que les arts qui servent aux véritables nécessités des hommes;* encore même *la plupart des hommes* en ce pays, étant adonnés à l'agriculture ou à conduire des troupeaux, *ne laissent pas d'exercer* les arts nécessaires pour leur vie simple et frugale. (*Fénélon.*)

(ii.) Les femmes filent cette belle laine, et en font des étoffes fines et d'une merveilleuse blancheur : elles font le pain, *apprêtent à manger;* et ce travail leur est facile, car *on ne vit en ce pays que de fruits* ou de lait, rarement de viande. Elles emploient le cuir de leurs moutons à faire une légère chaussure pour elles, pour leurs maris et pour leurs enfants ; elle font des tentes, dont *les unes* sont de peaux cirées, *les autres* d'écorce d'arbres ; elles font et lavent tous les habits de la famille, tiennent les maisons dans un ordre et une propreté *admirables*. (*Fénélon.*)

(iii.) Dans une *riante soirée* de mai, M. d'Orgères était assis avec Armand, son fils, sur le penchant d'une colline, *d'où il faisait admirer la beauté de la nature*, que le *soleil couchant* semblait revêtir, dans ses adieux, d'une robe pourpre. Ils furent distraits de leur douce rêverie par les chants joyeux d'un berger qui ramenait son troupeau bêlant de la prairie voisine. *Des deux côtés* du chemin qu'il suivait, s'élevaient des buissons d'épines, et *aucune brebis ne s'en approchait*, sans y laisser quelque dépouille de sa toison. (*Berquin.*)

(iv.) '*Assieds-toi* ici, près de moi et de ta sœur, mon pauvre Pierre,' disait une vieille femme ; 'assieds-toi, *ton front est tout en nage!* O merci, merci, mon fils ! Dieu ne peut manquer de bénir tôt ou tard l'enfant qui travaille ainsi pour sa famille ; mais je ne veux pas que tu te fatigues à ce point; *il faut te ménager des forces pour l'avenir.*' (*Mme. de Sévigné.*)

(v.) C'est à vous que je m'adresse, mon cher comte, pour vous écrire une des plus fâcheuses pertes *qui pût* arriver en France ; c'est celle de Monsieur de Turenne, dont je suis assurée que vous serez aussi touché et aussi désolé que *nous le sommes ici.* Cette nouvelle arriva lundi à Versailles ; le roi *en a été affligé*, comme *on doit l'être* de la mort du plus grand capitaine et du plus honnête homme *du monde;* toute la cour *fut* en larmes, et M. de Condon *pensa s'évanouir.* (*Mme. de Sévigné.*)

(vi.) Quand j'avais dix-huit ans—je vous parle d'une époque bien éloignée—j'allais, durant la belle saison, passer la journée du dimanche à Versailles ville *qu'habitait ma mère.* Pour m'y transporter, j'allais presque toujours à pied, rejoindre sur cette route une des petites voitures *qui en faisaient alors le service.* En sortant des barrières, j'étais toujours sûr de trouver un grand pauvre qui criait d'une voix glapissante : 'La charité, s'il vous plaît, mon bon Monsieur!' *De son côté* il était bien sûr d'entendre resonner dans son chapeau *une grosse pièce de deux sous.*

II.—*Second Year Students.*

(i.) Tout à coup à quelques pas d'eux, un cri de terreur est parti du milieu des ombres ; une flamme brillante a jailli. Le feu, par *une imprudence* inexplicable, *venait de prendre à la goélette*, et l'incendie se propageait avec une rapidité effrayante. *Tout ce que l'energie humaine a de plus actif* et de plus puissant est mis en œuvre, à l'instant même, pour combattre l'affreux danger. Hélas! inutiles efforts! le vent venait de s'élever ; l'horizon *s'était obscurci;* l'embrasement s'étendait vainqueur.

(ii.) Un homme vivait de son labeur, lui, sa femme et ses petits enfants ; et *comme il avait une bonne santé*, des bras robustes, et *qu'*il trouvait aisément à s'employer, il pouvait sans trop de peine pourvoir à sa subsistence et *à celle des siens.* Mais il arriva qu'une grande gêne étant survenue dans le pays, le travail y fut moins demandé, parce qu'il n'offrait plus de bénéfices à ceux qui le payaient, et en même temps le prix des choses nécessaires à la vie augmenta. L'homme de labeur et sa famille commencèrent donc à souffrir beaucoup. Après avoir bientôt épuisé ses modiques épargnes, il lui fallut vendre *pièce à pièce* ses meubles, d'abord, puis quelques-uns même de ses vêtements ; et, quand il *se fut ainsi dépouillé*, il demeura, privé de toutes ressources, face à face avec la faim. (*Lamennais.*)

(iii.) Les moines rentrant du travail, étaient occupés dans la vaste cour à dételer les bœufs et les buffles ; cette cour avait l'aspect d'une cour de grande ferme ; elle était encombrée de charrues, de bétail, de fumier, de volailes, de tous les instruments de la vie rustique. *Le travail se faisait sans bruit*, sans cris, mais sans affectation de silence, et comme par des hommes doués d'une décence naturelle, mais non commandés par une règle sévère et inflexible. Les *figures* de ces hommes, douces, sereines, respiraient la paix et le contentement. (*Lamartine.*)

(iv.) À la pointe du jour, il se dirigea vers sa barque amarrée au rivage ; *il crut y apercevoir debout* une forme humaine, la même à-peu-près que cette ombre qui *s'était esquissée* le soir sur la muraille. Il s'arrêta, frappé de cette ressemblance ; puis il raisonna et se persuada que ce pouvait être un effet de son imagination. Il fit quelques pas de plus, et reconnut pourtant que ce n'était point une illusion ; un homme, les bras croisés sous un vaste manteau, *se tenait* sur la barque, immobile et *plongeant du regard sur la* côte, comme s'il attendait quelqu'un. (*Mme. de Sévigné.*)

(v.) Saint-Hilaire, lieutenant-général de l'artillerie, fit prier M. de Turenne, qui allait d'un autre côté, de se détourner un instant pour venir voir une batterie : c'était *comme s'il eût dit :* Monsieur, arrêtez-vous un peu, car c'est ici que vous devez être tué. Un coup de canon vient donc, et emporte le bras de Saint-Hilaire, qui montrait cette batterie, et tue M. de Turenne : le fils de Saint-Hilaire se jette à son père, et se met à crier et à pleurer. 'Taisez-vous mon enfant,' lui dit-il, 'voyez' (en lui montrant M. de Turenne *roide mort*), 'voilà ce qu'il faut pleurer éternellement, voilà ce qui est irréparable ; et *sans faire nulle attention sur lui*, se met à crier et à pleurer cette grande perte.' (*Mme. de Sévigné.*)

(vi.) Le grand-maréchal s'étant levé en même temps que l'empereur, et, après avoir vainement fouillé toutes sés poches, il acquit enfin la certitude que, dans la précipitation qu'il avait mise à s'habiller, il avait oublié sa bourse. Or, il savait que Napoléon ne portait jamais d'argent sur lui ; *il hésitait dans le parti qu'il avait à prendre.* Le garçon attendait. Le total montait à douze francs. Pendant cet incident, l'empereur, qui n'a rien vu, *peu habitué à ce qu'on le fasse attendre*, ne conçoit pas la lenteur *que met Duroc à le rejoindre.*

B.—English-French Sight-Tests for November.

Translations, with explanatory notes, will be given of these passages in the November number of the Practical Teacher.

I.—*First Year Students.*

(i.) There are several gold and silver mines in this beautiful country ; but the inhabitants, simple and happy in their simplicity, deign (*daigner*) not to count only gold and silver among their riches ; they value (*estimer*) only what serves really for the needs of men.

(ii.) At the present time (say *at the hour that it is*), I own two houses in Paris, and I have handed over (*céder*) my paper factory (*fabrique*) to my son, to whom I have early (*de bonne heure*) taught the taste for work and perseverance. Do as I have done, my friend, and you will become rich as I have.

(iii.) Often the monks themselves fulfil this office in order to give to travellers temporal and spiritual help (*secours*, plur.) ; they fly (*voler*) to their aid whenever the 'marronnier' cannot alone suffice (*suffire*) to save them ; they lead them, sustain them, sometimes even bring them back on their shoulders even into the convent (*couvent*).

(iv.) The use of strong liquors is extremely dangerous in those moments, and often causes the loss of the travellers ; they believe (*croire*) they will *restore their warmth* (*se réchauffer*) by drinking brandy, and this drink does in fact give them for some moments heat and activity ; but this forced tension is very soon followed (*suivre*) by debility (*atonie*, f.) and exhaustion, which becomes *absolutely* without remedy.

(v.) You who, on going to bed (*se coucher*) of an evening, find a very soft (*doux*) bed ; who, on waking up (*se réveiller*) in the morning, find your meal all ready (*préparé*) ; you do not suspect (*douter*)

that quite near to you, up there perhaps, on the top floor (*dernier étage*) of the house you *live in* (*habiter*), a needy (*indigent*) family wants for (*manquer*) bread and firing.

(vi.) Never had Epamimondas displayed (*déployé*) more talent than on this occasion (*circonstance*, f.). He followed in his order of battle the principles which had procured him the victory of *Leuctres*. One of his wings (*aile*, f.), formed into a column (*colonne*, f.), fell on the Lacedemonian phalanx (*phalange*, f.), which it would never have broken (*enfoncer*), if he had not come himself to fortify his troops by his example, and by a body of chosen men (*élite*) by whom he was followed.

II.—*Second Year Students.*

(i.) After having eaten with a very good appetite, and having taken half a cup of coffee, which he pretended was better than that they served him with ordinarily (*habituellement*) at the Tuileries, he calls the waiter, asks him for the bill (*carte*), gets up, saying to Duroc, 'Pay, and let us return (*rentrer*); it is time.' Then, placing himself (*se poser*) on the doorstep of the café, he begins (*se mettre*) to whistle between his teeth an Italian air (*récitatif*).

(ii.) Having said these words, she held her peace (*se taire*) for a little while; then she replied: 'When I lost your father, it was a grief which I believed to be beyond (*sans*) consolation; however, you remained to me; but I felt only one thing then. Since, I have thought that if he lived, and if he saw us in this distress, his heart (*âme*) would break (*se briser*), and I have recognised that God had been good to him.'

(iii.) Suddenly a frightful tempest happened (use *venir*) to rise; the waves (*flots*), heaped up, beat with a crash (*fracas*) the rocks and the beach (*plage*, f.); in all directions, ships which had been seen sailing (*voguer*) peacefully just now, were firing (*tirer*) the distress gun; one of them, that which was nearest to the port, seemed ready to sink (*s'abîmer*) beneath the waves (*vague*), which from their crest hurled (*rejeter*) it into a frightful trough (*gouffre*).

(iv.) Before going to announce to his mother his fortunate *morning's work* (*matinée*), Pierre returned for a moment to his barque to examine the repairs he would have to make to his nets (*filets*). But what was not his surprise when on raising (*soulever*) them he perceived at his feet a purse which enclosed more than two thousand gold francs! His first thought was to believe that it was a piece of forgetfulness on the part of the unknown friend, and running immediately after him, he perceived him chatting (*causer*) in the middle of a group of strangers.

(v.) A fisherman, to whom this boat belonged, picked up the plate, and brought it to the governor. The latter, surprised, asked the fisherman, 'Have you read what is written on this plate, and has anyone seen it in your hands?' 'I cannot read,' replied the fisherman; 'I have just found it; no one has seen it.' This peasant was detained until the governor was well informed that he had never read, and that the plate had been seen by nobody. 'Go,' said he to him, 'you are very fortunate not to be able to read.'

(vi.) 'Marshal, read, I pray you, this little madrigal, and see if you have ever seen one as impertinent; because they know that lately (*depuis peu*) I have liked verses, they send me all sorts of them.' The Marshal, after having read, said to the king: 'Sire, your Majesty judges divinely of everything; it is true that that is the most foolish and most ridiculous madrigal I have ever read.' The King began to laugh, and said to him, 'Is it not true that he who composed it (*faire*) is indeed a coxcomb (*fat*)?' 'Sire, it is impossible to give him any other name.'

NEW PROBLEMS IN ARITHMETIC.

BY T. B. ELLERY, F.R.G.S.,
Vice-President National Union of Teachers.

BRIEFLY stated, my aim is to give such a collection of problems as will be useful to teachers in every class of school—problems which will set the children thinking, and yet not be too difficult. Where there is any difficulty, hints will be offered. I begin with Standard 3, and shall afterwards deal with Standards 4, 5, 6, 7, and possibly 1 and 2. For other remarks on the same subject I refer my readers to the *Girls' Mistress* for September 1st, in which appears the first of a series of papers on *Standard Problems for Girls, and How to Work them.* In passing let me say:—

1. Every exercise here given will suggest to the practical teacher many others of the same kind.
2. The blackboard should be freely used in the solution of these problems.

STANDARD 3.

A.

1. What number multiplied by 58 will give the same result as 87 × 64?

2. What number divided by 20 will give the same result as 4,176 ÷ 87?

3. A woman, on the 18th September 1894, had lived 79 years. How many days had she lived, reckoning 365 days in a year?

4. Tom has a crown, Fred half-a-crown, and John a florin. I have as much as the three together. How much have we in all?

5. I bought a number of penny buns, and when I paid for them I received 4s. 7d. change from a sovereign. How many did I buy?

6. I had in a box 2 half-crowns, 3 florins, 7 shillings, and 3 sixpences. How much more did I require to make a guinea?

7. Three boys went to the seaside for a day. One had a crown, the second had 1s. 3d. more than this, and the third had 6s. 11d. They spent altogether 15s. 3d. How much did they carry home?

8. A boy earned 28 pence on Monday, 23 pence on Tuesday, 30 pence on Wednesday, 2s. 5d. on Thursday, 1s. 9d. on Friday, and 2s. 3d. on Saturday. How many pence did he earn on the first three days more than on the other three?

9. A man saved £259 in fifteen years. In the first year he saved 20 guineas. How much did he save in each of the other years, taking one with another?

10. A boy wanted to buy a ten-guinea bicycle. He saved in the first quarter of the year £2 3s. 8d., in the second quarter £1 19s. 6d., in the third quarter £2 5s. 10d., and in the fourth quarter two guineas. His father then made up the amount required. How much did the father give?

11. I bought a horse, a pony, and a cart for fifty guineas. I gave £8 10s. for the cart, and twice that sum for the pony. What did I pay for the horse?

12. A fruiterer bought 9 dozen pears for six shillings; 20 of these were bruised, and could not be sold. For the remainder he charged a penny each. What did he gain?

B.

13. A boy earns 3s. 6d. a week, his mother earns as much again, and the father earns as much again as the mother? How much do they together earn in two weeks?

14. One man earns 5s. a day for 6 days in the week, and another man earns a guinea a week. How much will one earn more than the other in a month of four weeks?

15. There are 79 children in the infants' department of a school, 85 in the girls', and 82 in the boys'. How many buns will be required to give three to each of these children and have a dozen to spare?

16. John saves £25 a year for 20 years, and his brother saves £5 a year less than John for 18 years. How much has one saved more than the other?

17. A man earns 9s. a day for 6 days in the week. His living expenses every week amount to £2 4s. How long will he take to save £5?

18. A fruiterer bought 100 apples for 5s. He sold one-half of them at a penny each, and the others at 5 for 6d. What did he gain?

19. A man has three half-crowns. He buys 72 half-penny apples and spends the rest in penny apples. How many penny apples does he buy?

20. A man bought three thousand eight hundred and seventy-five oranges. He received first 500 and then 250, and the remainder came in boxes, each box containing 125. How many boxes were used?

21. A fruiterer bought one thousand two hundred and forty-two oranges at eighteen for a shilling, but he had only £3 with which to pay the bill. How much more did he require?

22. I bought 2 dozen penny stamps and a certain number of half-penny stamps, and received 1s. 6d. change from a crown. How many half-penny stamps did I buy?

23. I buy a quart of milk and two eggs every day of the week. The milk costs 2d. a pint and the eggs a penny each. How many pence do I spend every week in milk and eggs? (Reckon 2 pints in a quart and 7 days in a week.)

24. A tradesman bought five dozen neckties. He found some of these were soiled and could not be sold, and he sold the others at 1s. each, receiving in all £2 12s. How many were soiled? [A knowledge of the shillings table required.]

C.

25. I had to pay a bill amounting to £250. In order to raise the money I sold five horses at £18 each, 6 cows at £24 each, and a certain number of sheep at £2 each. This exactly made up the money required. How many sheep did I sell?

26. If I can buy 36 yards of cotton for a farthing, how many yards can I buy for a shilling? [A knowledge of the farthings table to 1s. required.]

27. A road 1,500 yards long is planted with trees on both sides, each side beginning and ending with a tree. If these trees are placed 20 yards apart, how many are planted? [Note the tree at the *beginning* on each side.]

28. A train begins its journey at half-past 7 in the morning and runs at the rate of 32 miles an hour. How far has it run by half-past 3 in the afternoon, allowing one hour for stoppages?

29. The franc is worth 9½d. of our money. How many francs should be exchanged for £3 15s. 2½d.? [This will suggest, How many payments each ——— can be made with ———?]

30. Two towns are 36 miles apart. John lives in one town and James in the other. They start at 9 o'clock in the morning to meet each other, John walking 3 miles an hour and James 4 miles an hour. How far apart will they be at noon (that is 12 o'clock)?

31. A farmer had 2,800 apples. He kept 800 for his own use, and the rest he sent to market, one-half of them in baskets, each holding 40, and the remainder in baskets each holding 50. How many baskets were used?

32. How many fowls at half-a-crown each can I buy with the money received from the sale of 4 rabbits at 1s. 6d. each and 2 hares at 5s. 9d. each? [A knowledge of the half-crown table to £1 required.]

33. A farmer bought 8 horses for £160. He kept them for a week at a cost of 2s. 6d. each, and then sold six of them at £21 each, and the others at £25 each. What did he gain? [A knowledge of the half-crown table to £1 is also required here. Note the cost of the keep of *each* of the 8 horses was 2s. 6d.]

34. A fruiterer had 11,925 oranges. He sold 75 to one man and twice that number to another. The rest he sold to a number of men, each of whom bought 150. How many buyers were there altogether?

35. I divide 15s. 6d. between two men, giving one 3s. 6d. more than the other. What does each receive? [The amount that is equally divided is 15s. 6d. — 3s. 6d. = 12s.]

36. What is the nearest number greater than 38,725 which is exactly divisible by 58?

[3)17(5
15
2

Here we have 5 *threes* and 2 towards another *three*. To obtain the sixth *three* we want 1 more. This 1 is the difference between the remainder 2 and the divisor 3. We therefore add 1 to the dividend 17 and obtain 18, and that is the nearest number greater than 17 which is exactly divisible by 3.

Other examples:—

5)23(4
20
3
5 − 3 = 2
23 + 2 = 25

7)25(3
21
4
7 − 4 = 3
25 + 3 = 28

and so on.]

NEW PROBLEMS.—ANSWERS.

A.	B.	C.
(1) 96.	(13) £2 9s.	(25) 8 sheep.
(2) 960.	(14) 36s. or £1 16s.	(26) 1,728 yards.
(3) 28,835 days.	(15) 750 buns.	(27) 152 trees.
(4) 19s. 0d.	(16) £140.	(28) 224 miles.
(5) 185 buns.	(17) 10 weeks.	(29) 95 francs.
(6) 1s. 6d.	(18) 4s. 2d.	(30) 15 miles.
(7) 2s. 11d.	(19) 54 penny apples.	(31) 45 baskets.
(8) 4 pence.	(20) 25 boxes.	(32) 7 fowls.
(9) £17.	(21) 9s. 0d.	(33) £15.
(10) £1 19s.	(22) 36 halfpenny stamps.	(34) 80 buyers.
(11) £27.	(23) 42 pence.	(35) 6s.; 9s. 6d.
(12) 1s. 4d.	(24) 8 neckties.	(36) 38,744.

(Some of the Problems in this Series of Papers are based on those given by the Education Department.)

OUR 1894 CERTIFICATE CLASS.

BY GEORGE BEACH, M.A., LL.D. (DUBLIN),
Author of '*Elements of English*,' '*A Girls' Arithmetic*,' '*Entertaining Readers*,' *etc.*

I. ANTITHETA OF BACON'S ESSAYS.

Essay XIV.

For.	*Against.*
1. Those who have virtue in the blood find baseness not so much alien to them as impossible.	1. It is rare for virtue to beget nobility, still rarer for nobility to beget virtue.
2. Nobility is the laurel-wreath wherewith men are crowned by Time.	2. Noblemen more often have to thank their ancestry for pardon than for advancement.

3. We respect antiquity even in lifeless monuments; how much more in living ones?

4. If one is to despise nobility in a man's relations, what will be the difference between the offspring of men and the offspring of beasts?

5. Nobility withdraws virtue from envy and recommends it to favour.

3. Such is the energy of rising men, that by their sides noblemen seem lifeless statues.

4. Noblemen look back too often in the race—a sign of a bad runner.

Essay XVI.

For.	*Against.*
1. Those that err through zeal should win our affection, though they cannot gain our approval.	1. As apes are uglier on account of their likeness to men, so is superstition for its likeness to religion.
2. To morality we owe mediocrity, but perfection we get from religion.	2. Just as we are compelled to hate self-will in matters of state, so ought we to hate superstition in religious affairs.
3. Superstition is but religion in the bud.	3. 'Twere better to have no opinion of God, than such an idea as is insulting to him.
4. I would rather believe the most incredible wonders of any region whatever, than that everything around us goes on without a *Will*.	4. It was not the Epicureans but the Stoics who troubled the ancient commonwealths.
	5. The constitution of the human mind is such that a man cannot be a genuine and dogmatic atheist. The man that is always handling things, and never reverencing them—the great hypocrite—he is your true atheist.

II. Remarks on Bacon's Essays.

(*a*) The first edition was given to the world in January 1597. They formed part of a small book dedicated '*To M. Anthony Bacon, his deare Brother*,' which comprised in addition, '*Places of Persuasion and Disuasion*' and '*Religious Meditations*.' They were only *ten* in number, and were as follows :—

1. Of studie.
2. Of discourse.
3. Of Ceremonies and respects.
4. Of followers and friends.
5. Sutors.
6. Of expence.
7. Of Regiment of health.
8. Honour and Reputation.
9. Of Faction.
10. Of Negociating.

In 1612 the second edition, containing thirty-eight essays, appeared, with a dedication to Sir John Constable, who was the husband of Dorothy Barnham, the sister of Lady Bacon.

The essayist had already written a dedication to Prince Henry, but upon his death substituted the one above referred to.

Thirteen years later he reprinted them, having increased their number to fifty-eight, which, together with a fragment of an Essay on Fame, is their complete tale.

(*b*) In most of the modern editions of the Essays the spelling has been modernised. Just as in the case of The Bible and *Shakespeare*, it is considered that they are not for an age, but for all time. However, we give a short extract, in order to show the orthography of the first edition.

Of Studies.

'Studies serue for pastimes, for ornaments, for abilities; their chiefe vse for pastimes is in privateness and retiring; for ornaments in discourse; and for ability in Iudgment and disposal of business; for expert men can execute, but learned men are more fit to Iudge and censure: to spende to much time in them is sloth: to vse them to much for ornament is affectation: to make Iudgment wholely by their rules is the humor of a scholler: they perfect nature, and are themselues perfected by experience: crafty men contemne them, wise men vse them, simple men admire them, for they teache not their owne vse, but that there is a wisdome without them, and aboue them wonne by observation: Reade not to contradict, nor to beleeue, but to weigh and consider.'

(*c*) The best edition to possess, in addition to 'Lewis,' is that in two volumes by Dr. Abbott contained in the 'London Series of English Classics.'

III. Algebra.

First Year.

The following 'proofs' have been requested during the last twelve years. It is scarcely too much to say that none others, except such as are deducible from these, have been given :—

(*a*) If $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}$, then, $\frac{a}{b}=\frac{ma+nc+pe}{mb+nd+pf}$. (Twice.)

(*b*) $S=\frac{a(f^n-1)}{f-1}$ in G.P. (Four times.)

(*c*) $S=\frac{n}{2}\{2a+(n-1)d\}$ in A.P. (Five times.)

(*d*) A ratio of greater inequality is diminished, and a ratio of less inequality is increased by adding the same quantity to each term. (Three times.)

(*e*) The rule for finding the G.C.M. of two expressions. (Six times.)

(*f*) Prove that a recurring decimal containing p figures is an infinite G.P. whose ratio is $\frac{1}{10^p}$. (Twice.)

(*g*) The L.C.M. of A and $B=AB\div$ by their G.C.M. (Once.)

(*h*) The method of extracting the square root of $a+\sqrt{b}$. (Once.)

(*i*) $(a^m)^n=a^{mn}$; and $a^m\div a^n=a^{m-n}$. (Twice.)

(*j*) $\frac{a}{b}\div c=\frac{a}{bc}$. (Twice.)

(*k*) The square root of a rational quantity cannot be partly rational and partly a quadratic surd. (Once.)

(*l*) The sum of the roots of the equation $x^2-2px+q^2=0$ is equal to $2p$, and their product is equal to q^2. (Twice.)

(*m*) If a and b are the two first terms in a H.P., then the nth term is $\frac{ab}{(n-1)a-(n-2)b}$. (Once.)

(*n*) The rule for square root. (Once.)

(*o*) When $n+1$ figures of a square root have been obtained by the ordinary method, n more may be obtained by division only, supposing $2n+1$ to be the whole number. (Once.)

(*p*) When $n+2$ figures of a cube-root have been obtained by the ordinary method, n more may be obtained by division only, supposing that $2n+2$ be the whole number. (Once.)

Second Year.

(*a*) The rule for casting out the nines in multiplication, showing in what cases it might fail. (Three times.)

(*b*) First Year (*i*). (Once.)

(*c*) The rule for cube-root. (Twice.)

(*d*) The number of permutations of n things taken r together. (Five times.)

(*e*) Amount of a given sum at a given rate (C.I.) for a given number of years. (Twice.)

(*f*) $\text{Log.}\left(\frac{ab}{c}\right)=\text{log. }a+\text{log. }b-\text{log. }c$. (Five times.)

(*g*) If A be a sum of money due n years hence at r per cent. (S.I.), D the discount, $D=\frac{Anr}{100+nr}$. (Twice.)

(*h*) The Binomial Theorem for positive integral powers. (Four times.)

(*i*) $M=P(1+r)^n$, where P = Principal, M = Amount, r = compound interest of £1 for 1 year. (Six times.)

(*j*) First Year (*f*). (Once.)

(*k*) The number of combinations of n things taken r at a time = number taken $n-r$. (Three times.)

(*l*) First Year (*o*). (Twice.)

(*m*) If a, b, be employed as bases, $\log._b M=\log._b a\times\log._a M$. (Four times.)

(*n*) The formula to express the present value of an annuity to commence at the end of m years, and to continue to n years. (Three times.)

(*o*) First Year (*e*). (Once.)

(*p*) First Year (*a*). (Once.)

(*q*) The number of combinations of n things taken r together. (Three times.)

(*r*) First Year (*l*). (Once.)

(*s*) First Year (*c*). (Twice.)

(*t*) First Year (*m*). (Once.)

(*u*) The formula for finding the greatest term of $(1+x)^n$, when n is an integer. (Once.)

(*v*) In the expansion of $(1+x)^n$, there are $(n+1)$ terms. (Once.)

(*w*) The A.P., G.P., and H.P., between any two quantities are in G.P. (Once.)

(*x*) The sum of the coefficients of the terms in the expansion of $(1+x)^n = 2^n$. (Twice.)

(*y*) The sum of the coefficients of the odd terms = the sum of the coefficients of the even terms. (Twice.)

(*z*) First Year (*b*). (Twice.)

IV. MENTAL ARITHMETIC PAPER.

(*Twenty minutes allowed for this paper.*)

1. 25 cwt. 25 lbs. reduced to lbs. =

2. The mean proportional between 336 and 525 =

3. $(26)_3 - (25)^3 =$

4. 2s. 7½d. expressed as decimal of 9s. 2¼d. =

5. $\sqrt{22\frac{9}{16}} \div \cdot 04 =$ the mixed number.

6. 3 cwt. 1 qr. 8 lbs. at 16s. 4d. per cwt. =

7. Income from investment at 4¼ per cent. is £212 10s. Then the investment must =

8. A man's income is £466 13s. 4d. He spends 87½ per cent. of it. His savings =

9. A, B, and C, invested £620, £760, and £1,100, in a business. A year's profits are £266 18s. 6d. Therefore A's share of the profits =

10. $\cdot 69 \times \cdot 69$ as a vulgar fraction in lowest terms =

11. 384 articles at 4s. 9½d. each =

12. Simple Interest on £145 1s. 6d. for three years at 4⅛ per cent. per annum =

13. When income tax is 9d. in the £, a man's net income is £462 19s. 3d. When 6d. in the £ is the income tax, his net income =

14. True discount on £171 4s. 9d. due 3½ years hence at 4 per cent. per annum simple interest =

Answers: (1) 2,825 lbs.; (2) 420; (3) 1951; (4) ·285714; (5) 23¾; (6) £2 14s. 3d.; (7) £5,000; (8) £105 3s.; (9) £66 14s. 7½d.; (10) $\frac{1681}{1849}$; (11) £92; (12) £18 2s. 8¼d.; (13) £468 19s. 6d.; (14) £21 0s. 7d.

V. *Questions already set upon 'Coming' and 'Passing of Arthur.'*

1. Write a brief essay on 'The Legend of King Arthur.'

2. Analyse *From*

'Woe is me,
Authority forgets a dying king,'

To

'I will arise and slay thee with my hands.'

3. Parse from the preceding the words *Woe, me, widowed, That, what, thou, should, Either, girl, for, thee, spare, slay.*

4. Analyse *From*

'And answer made the bold Sir Bedivere,'

To

'Three times and drew him under in the mere.'

5. Parse from the preceding the words *lest, shall, till, Not, lives, great, miracle, as, hilt, brandished, under.*

6. Exhibit in a table the principal tenses of all the irregular verbs occurring in Questions 2 and 4.

7. Make a list of ten words from these passages which are not of Anglo-Saxon origin, and explain their etymology.

8. Explain the following expressions:—

(*a*) 'like streamer of the northern moon.'
(*b*) 'the moving isles of winter shock.'
(*c*) 'looking . . . larger than human on the frozen hills.'
(*d*) 'the long glories of the winter morn.'
(*e*) 'his greaves and cuisses dashed with drops of onset.'
(*f*) 'the island valley of Avilion.'
(*g*) 'who, with lance in rest, . . . shot through the lists at Camelot.'
(*h*) 'such times have not been since the light that led the holy elders with the gift of myrrh.'

9. Analyse *From*

'So all day long the noise of battle rolled,'

To

'Lay a great water, and the moon was full.'

10. Parse from Question 9 the words *long, winter, until, Had, their, Arthur, nigh, chancel, stood, water.*

11. Analyse *From*

'Then spake King Arthur to Sir Bedivere.'

To

'That without help I cannot last till morn.'

12. Parse from Question 11 the words *Wherewf, such, sleep, men, loved, Delight, Walking, as, that, that be, till.*

13. Pick out from Questions 9 and 11 five nouns or adjectives of Latin and five of Anglo-Saxon origin, and comment upon the etymology of each.

14. Give examples from 'The Passing of Arthur' of some of the figures of speech most frequently occurring in English poetry.

15. Parse the italicised words of the following passage, giving rules in each case:—

'A doubtful throne is *ice* on summer seas.
Ye come from Arthur's court. *Victor* his men
Report him. *Yea*, but ye; think ye, this *king*,
So many *those* that hate him and so strong,
So few his *knights*, *however brave* they *be*,
Hath body enough to hold his foemen down?'

16. Analyse:—

'Such sleep
They sleep, the men I loved, I think that we
Shall never more at any future time
Delight our souls with talk of knightly deeds
Walking about the gardens and the halls
Of Camelot, as in the days that were.'

17. Comment on (*a*) Heathen horde; (*b*) Excalibur; (*c*) Mage Merlin; (*d*) Tintagil; (*e*) Samite; (*f*) Vert and Azure; (*g*) Great lords from Rome.

18. Paraphrase:—

'Woe is me
To 'Valuing the giddy pleasure of the eyes.'

19. Analyse:—

'Yet still thy life is whole, and still I live,'
To 'Modred, unharmed, the traitor of thine house.'

20. Give a sketch of the scene at the foundation of the Round Table, explaining the object of introducing the three Queens, Merlin, and the Lady of the Lake.

21. Explain the following:—

(*a*) 'Clothed with his breath, and looking, as he walked,
Larger than human on the frozen hills.'
(*b*) 'Back to the sunset bound of Lyonesse,
A land of old upheaven from the abyss
By fire.'
(*c*) 'All his greaves and cuisses dashed with drops
Of onset.'

22. Analyse:—

'Then the king in low deep tones,'
To 'Half blinded at the coming of a light.'

23. Parse the words printed in italic in the following extracts:—

(*a*) 'An old man's wit may wander *ere he die.*'
(*b*) '*O that ye had* some brother, pretty one,
To guard thee on the rough ways of the world.'
(*c*) 'Nine *years* she *wrought it, sitting* in the deep.'
(*d*) 'I see *thee what thou art.*'
(*e*) 'I *thy hest* will *all* perform *at full.*'

24. In what sense does the poet use these words and phrases, and what is their meaning and origin?—*Puissance, Winsome, Postern-gate, Vert and Azure, Wizard, The Daïs throne, Lief and dear, Unsolders, Subtlest jewellery, Mage.*

25. Explain these passages, quote the context, and show in what connection they stand:—

(*a*) 'In his ways with men I found him not.'
(*b*) 'God fulfils Himself in many ways.'
(*c*) 'Authority forgets a dying king.'
(*d*) 'Truth is this to me, and that to thee.'
(*e*) 'The swallow and the swift are near akin.'

26. Describe the versification employed by Tennyson in the Arthurian poems. Quote one or two lines which appear to you to be perfect or typical examples of the metre, and give reasons for selecting them.

27. Say whence Tennyson obtained the material for the '*Idylls of the King*,' and what, if any, of historical foundation there is for these legends.

28. What do you regard as the chief merits of these poems? Quote from them any examples of felicitous epithets, of striking imagery, or of important truths, which appear to you to be worth remembering.

29. Contrast, briefly, the conceptions of duty and of a noble life which characterised the age of chivalry, with those which prevail in modern times.

VI. How to Study History.

The great difficulty of studying History is the product of dry-as-dust historians, men who have merely arranged affairs in chronological order, and not in the rational sequence of cause and effect. Thus only the memory has been exercised, and positive mental disgust has been excited by the treadmill process of learning off lists of battles, treaties, and Acts of Parliament. Candidates have been compelled to drudge among the dry bones of facts instead of mingling with the heroes and common people of past ages—men of like passions with ourselves.

It has been well remarked that no man ever lived whose story, if properly related, would not possess, to any healthy mind, an absorbing interest.

And if this be the case, as surely it is, when we deal only with a single, an ordinary, an obscure individual, confined to paltry affairs, chilled by penury, and unexcited by lofty opportunities, how much the more would the astounding drama of a race or nation, the makers of epochs, the wielders of vast forces, the combatants in a world-wide arena, entrance the attention, excite the intellect, and arouse the emotions!

Unfortunately we have not yet arrived at the time when History has altogether found its proper position as ancillary to Sociology, and by evil chance examinations have to be passed, rather than education evolved.

How shall we proceed, then, to make the best of existing circumstances, to assist mechanical memory, and to secure as much training of the intelligence as may be?

(*a*) Get a fairly accurate knowledge of the geography and topography of the theatre of events, and of the essential characteristics of the race whose history is under consideration.

(*b*) Read carefully over a mere outline of the nation's career.

(*c*) Study the lives of men typical of their times; and, if possible, read any dramas or standard novels concerning them or their periods.

(*d*) Begin now to learn a few dates, not too many at a time, but coincidently with the further steps of your method.

(*e*) Trace the social side of the nation's path: its progress in civilization, commerce, comfort, manufactures, literature, art, science and exploration.

(*f*) Turn next to the political aspect, and watch the advance from autocracy to aristocracy, from aristocracy to the rule of the middle class, and from this last to an ever-broadening democracy.

Be not misled by any fluctuations, but endeavour to distinguish incidental retrogressions from the general flow. If the national course be long enough, the gradual corruption of a democracy, and the inevitable result of a military despotism, may perhaps be noted.

(*g*) Naval and military operations demand our next attention. Many of these facts must have incidentally been touched upon in any cases where they have assisted to mould character, and to advance or retard social or political progress.

This division may be again subdivided into Domestic and Foreign Wars, and each part studied separately. In cases where oft-repeated and stubbornly contested conflicts have occurred between the same combatants, these should be studied as a whole.

(*h*) Lastly, dynastic information should be sought, and the alliances with foreign royal houses. This branch is not proposed too late, for where our sovereigns have been truly great, or abjectly mean (*e.g.*, Elizabeth and John), we shall have made their acquaintance under heads (*c*) and (*f*) and perhaps (*g*) also.

This systematic study not only covers the ground many times, but it is not so formidable as it looks. When a fact has been learned under one head, it has not to be learned again, but only arranged under another head; and the whole mass of information, bound together by many links, illuminated from many sides, and vivified by laborious intelligence, will possess a complete unity and living entity of its own.

VII.—MODEL ANSWERS TO FRENCH.

Second Year.

Friday, 15th December 1893, 11 to 1.

Section I.

Translate into English:

(*a*) Monsieur, puisque vous le voulez, je vous dirai franchement qu'on se moque partout de vous, qu'on nous jette de tous côtés cent brocards à votre sujet, et que l'on n'est point plus ravi que de vous tenir au cul et aux chausses, et de faire sans cesse des contes de votre lésine. L'un dit que vous faites imprimer des Almanachs particuliers, où vous faites doubler les quatre-temps et les vigiles afin de profiter des jeûnes où vous obligez votre monde; l'autre que vous avez toujours une querelle toute prête à faire à vos valets dans le temps des étrennes ou de leur sortie d'avec vous, pour vous trouver une raison de ne leur donner rien. Enfin, voulez-vous que je vous dise? On ne saurait aller nulle part, où l'on ne vous entende accommoder de toutes pièces. Vous êtes la fable et la risée de tout le monde; et jamais on ne parle de vous que sous les noms d'avare, de ladre, de vilain, et de fesse-mathieu.

L'Avare.—Act III., Scene V.

(*b*)

J'étais à ma fenêtre
Et je pensais à vous devant le ciel d'été.
Dans le jardin, parmi la fraiche obscurité,
Un rossignol chantait, et ses notes perlées
Montaient éperdument aux vôutes étoilées.
Tout à coup j'entendis dans l'ombre un autre chant
Aussi divin, aussi sublime, aussi touchant
Que celui de l'oiseau. Je me penche et regarde,
Et je vois le bossu tout seul dans sa mansarde,
Assis à son pupitre, et l'archet à la main.
Son violon, avec un accent presque humain,
Exprimant un amour où la douleur se mêle,
Egalait en douceur la voix de Philomèle.

Le Luthier de Crémone.—Scene II.

(*a*) Sir, since you wish, I will tell you candidly, that you are made fun of everywhere, that on your account a hundred taunts are cast at us on all sides, and that people are never more delighted than when abusing you soundly and incessantly relating tales of your stinginess. One relates that you have had special calendars printed in which the beginning of the four seasons and vigils are doubled in order to profit by the fasts to which you subject your household; another asserts that you always have a quarrel ready to pick with your servants at the time of New Year's gifts (Christmas boxes), or of their departure from you, so as to find a reason for not giving them anything. Lastly, shall I tell you? One can go nowhere without hearing you pulled to pieces. You are the butt and laughing-stock of everyone; and you are never spoken of except by the names of miser, niggard, villain, and skinflint.

L'Avare, Act III., Scene V.

(*b*) I was at my window and was thinking of you beneath the summer sky. In the garden in the cool darkness a nightingale was singing, and its brilliant notes mounted distractedly to the starry arch. All at once I heard through the gloom another song as divine, sublime, and touching as that of the bird. I lean out to look, and see the hunchback all alone in his garret, seated at his desk, with his fiddle-stick in his hand. His violin, with almost human tone, expressing love with which is mingled grief, equalled the voice of the nightingale in its sweetness.

Le Luthier de Crémone.—Scene II.

Section II.

Translate into French either (*a*) or (*b*), but not both of them:—

(*a*) Your audacity is indeed wonderful! Understand then, to prove you wrong, that at least sixteen years have passed since the man of whom you are speaking perished at sea with wife and children, when carrying out his desire to snatch away their lives from the fierce persecutions that raged during the revolutionary troubles at Naples and caused several noble families to flee thence into exile.

(*b*) True:—but pray understand, on your part, to demolish your argument, that his son, then seven years old, with a servant, was saved from that shipwreck by a Spanish vessel; and that the son thus saved is he who now addresses you. Let me explain to you, further, that the captain of that ship, touched by my misfortune, conceived a friendship for me; that he had me brought up as his own son; and that, as soon as I became capable of so doing, I took up arms as my profession.

(*a*) L'audace est merveilleuse! Apprenez, pour vous confondre, qu'il y a seize ans, pour le moins, que l'homme dont vous parlez périt sur mer avec ses enfants et sa femme, en voulant dérober leur vie aux cruelles persécutions qui ont accompagné les désordres de Naples, et qui en firent exiler plusieurs nobles familles.

(*b*) Oui; mais apprenez, pour vous confondre, vous, que son fils, âgé de sept ans, avec un domestique, fut sauvé de ce naufrage par un vaisseau espagnol; et que ce fils sauvé est celui qui vous parle. Apprenez que le capitaine de ce vaisseau, touché de ma fortune, prit amitié pour moi; qu'il me fit élever comme son propre fils, et que les armes furent mon emploi, dès que je m'en trouvai capable.

In Section III., answer FIVE sub-questions in 1, *or* FOUR sub-questions in 2. Do not answer sub-questions in both 1 and 2.

Section III.

(Answer not more than FIVE of the sub-questions below.)

1. Translate, commenting on any peculiarities :—

(*a*) 'Je croyois bien faire d'accourir vite.'
(*b*) 'Comment, Pendard, tu as l'audace d'aller sur mes brisées !
(*c*) 'Allons, que l'on détale de chez moi, maître juré filou.'
(*d*) 'Vous donnez furieusement dans le marquis.'
(*e*) 'Vingt pistoles rapportent par année dixhuit livres, six sous, huit deniers ; à ne les placer qu'au denier douze.'
(*f*) 'Qui sentent tant soit peu l'échelle.'
(*g*) 'Ce que bon me semble.' (Explaining why 'que,' and not 'qui' is used.)
(*h*) 'Cela tient du prodige,' *and* 'm'en vouloir.'

(Answer not more than FOUR of the sub-questions below.)

2. (*a*) Put these into French :—'I shall go when I have finished'; 'Courage is needed' ; 'How very much courage is required !'
(*b*) } Distinguish between 'apercevoir' and 's'apercevoir' ;
} And give instances of the use of 'chaque' and 'chacun.'
(*c*) 'Fussé-je paresseux.' 'Il n'est point de meilleure voie.' How would you render these in modern colloquial French ?
(*d*) What do you know as to the gender of 'Amour' ?
(*e*) Trace the origin and meaning of :—'Luthier,' 'Mansarde,' 'Aiguière,' 'Naguère,' 'Crin-crin,' 'Carre-four.'

1. (*a*) I thought I had better run fast. The form *croyois* is an old form for *croyais*.

L'Avare.—Act III., Scene XIV., Line 18.

(*b*) How now, rascal, you have the audacity to follow in my track ?

Brisées at first were branches broken down by a huntsman in pursuit of game ; the term was afterwards applied to the road itself ; *aller sur les brisées* of anyone then signifies to follow a course traced out with difficulty by another person.

L'Avare.—Act IV., Scene III., Line 33.

(*c*) Come, pack out of my house, you sworn master of the guild of thieves.

Détaler was originally used of merchants packing up their wares.

Les jurés in corporations were men who had taken the oaths exacted by the mastership. The *maîtres jurés* watched over the observance of statutes and rules adopted by the working bands.

A *maître juré filou* is then a thief who satisfies all the conditions of his trade.

Thus these words may be translated 'an out-and-out thief.'

L'Avare.—Act I., Scene III., Line 1.

(*d*) *Donner dans* is equivalent to *tomber* or *se lancer avec impétuosité*.

You affect the marquis terribly.

L'Avare.—Act I., Scene V.

(*e*) Twenty pistoles bring in eighteen livres, six sous, eight deniers per year, only placing them at eight per cent. *Pistole* is a coin worth ten francs.

Au denier douze = a little more than eight per cent., one denier interest for twelve. The *denier* was a small coin equal to $\frac{1}{12}$ of a sou. It is still employed in such phrases as 'le denier de la veuve' = the widow's mite ; 'le denier de St. Pierre' = Peter's pence. L'Avare.—Act I., Scene V.

(*f*) Which savour a little of hanging.

L'échelle was a scaffold which was ascended by steps which had the form of ladders ; it served for punishments less than that of death ; perjurers, blasphemers, etc., were fastened there and were exposed to the gaze of the crowd. *L'échelle* was a symbol of high justice.

L'Avare.—Act II., Scene I.

(*g*) Whatever seems good to me.

More freely, it might be translated :—Whatever I like. *Qui* is not used because que is the object of the infinitive understood = ce qu'il me semble bon de renfermer.

L'Avare.—Act I., Scene III.

(*h*) It is like a miracle.

Tenir de = to be like, to partake of the nature of, or to have heard from (in the sense of a piece of news).

Le Luthier.—Scene I.

To be angry with me.

Note difference between je le veux = I will have it so, and je lui en veux = I am angry with him.

Le Luthier.—Scene VI.

2. (*a*) 'J'irai quand j'aurai fini' ; 'Il faut du courage' ; 'Qu'il faut de courage !'

(*b*) *Apercevoir* is to see, in the sense of *to catch a glimpse of*. *S'apercevoir* is to see, in the sense of *to become aware of*.

Chaque is a distributive adj., and *chacun* a distributive pronoun.

Chaque can only be used in conjunction with a noun, as *chaque âge à ses plaisirs*.

Chacun is used by itself, as *chacun à son goût*.

(*c*) Si j'étais paresseux.' 'Il n'y a point de meilleure voie.'

(*d*) *Amour* is masculine in the singular, and feminine in the plural, but when it means *a cupid* it is always masculine.

(*e*) *Luthier* is derived from Al'ud, the Arabic word for *Lute*. All the other European forms, as well as the French, of this word, by the aphaeresis of the initial vowel of the definite article *al* have been derived from the Arabic. The Portuguese is the only one which retains the *al*.

Luthier means a maker of lutes.

Mansarde, an attic or garret, with a sloping roof, owes its name to the celebrated French architect François Mansart or Mansard (1598–1666), who first introduced this mode of construction.

Aiguière means 'ewer,' properly a water-vessel. This word is derived from *aigue*, the old French form for *eau*, Latin *aqua*. This form *aigue* has remained in *aigue-marine*, and in some geographical names, such as *Aigue-Perse*, *Aigues-Mortes*.

Naguère = latterly, formerly. This adverb comes from the impersonal phrase : Il n'a guères = Il n'y a guères, which is equivalent to il n'y a pas longtemps de cela. *Guère* means *multum*, and only stands for little, hardly, through the addition of *ne*.

Crin-crin = a bad fiddle or fiddler, is derived from 'crin' = horsehair, and thence is applied to a bad fiddle because of the noise produced by the vibrations of horse-hair.

Carre-four is from the Latin *quadrifurcum*, which means *four forks*, and thus means cross-roads.

Section IV.

Translate :—Il avait erré pendant quarante-deux jours à travers l'Angleterre, successivement caché dans huit asiles différents ; quarante-cinq personnes de toute condition, dont les noms sont connus, et sans doute plusieurs autres qu'on ignore, avaient su qui il était et où il était. Pas une ne trahit, même par une indiscrétion, le secret de sa présence ou de ses mouvements. Un dévouement sincère donne aux plus simples de l'habilité et aux plus faibles de la vertu.

GUIZOT.—*Histoire de la République d'Angleterre et de Cromwell.*

He had wandered for forty-two days through England, successively hidden in eight different hiding-places ; forty-five persons of every position, whose names are known, and doubtless many others who are not known, knew who and where he was. Not one betrayed, even by indiscretion, the secret of his presence or movements. Sincere devotedness gives skill to the simplest and virtue to the most feeble.

VIII. Coriolanus for Repetition.

Act.	Scene.	Lines.
I.	IV.	8–62
I.	IX.	1–66
II.	I.	195–213
III.	I.	50–180
III.	I.	265–270
III.	II.	1–13
III.	III.	93–107
III.	III.	120–135

The above selections, eight though they be in number, will be found to have a connectedness and even unity of their own.

IX. Parsing, Analysis, Etc., for Routines.

A.—First Year.

(*a*) *First Friday* (Men). 'Passing of Arthur,' Lines 424 to 432 for Analysis. Parse *am going, way, sense, indeed, For, is clouded, Where, vain, fair, hollows, me.*

(*b*) *First Friday* (Women). 'Princess,' Lines 89 to 99 of Canto I. for Analysis. Parse *when, that, found, her, out, Laid, lying, bathed, What, wherefore, break.*

(*c*) *Third Monday* (Men). 'Passing of Arthur,' Lines 372 to 382 for Analysis. Parse *Place, So, There, those, swift, tallest, all, loud, dropping, Striped, for.*

(*d*) *Third Monday* (Women). 'Princess,' Prologue, Lines 100 to 109 for Analysis. Parse *child, half, as, had wound, That, warrior, Glow, like, sunbeam, guests, preached.*

(*e*) *Fourth Monday* (Men). 'Passing of Arthur,' Lines 304 to 314 for Analysis. Parse *flashing, whirled, Shot, like, streamer, Seen, where, Excalibur, ere, Clothed, wonderful.*

(*f*) *Fourth Monday* (Women). 'Princess,' Canto II., Lines 348 to 359 for Analysis. Parse *rounded, lecture, lilted, odes, five-words-long, That, ever, That, whatsoever, is.*

B.—SECOND YEAR.

(*a*) *First Friday* (Men). As in First Year.

(*b*) *First Friday* (Women). 'Coriolanus,' Act I., Scene iii., Lines 30 to 40 for Analysis. Parse *Indeed, Methinks, hither, pluck, As, children, Volsces, shunning, cowards, were born.*

(*c*) *Second Friday* (Men). Paraphrase 'Bacon's Essay,' 19, from '*Let us now speak*' . . . to . . . '*a remedy worse than the disease.*'

(*d*) *Second Friday* (Women). 'Coriolanus,' Act II., Scene iii., Lines 240 to 251 for Paraphrasing.

(*e*) *Third Friday* (Men). Paraphrase 'Hamlet,' Act II., Scene ii., Lines 523 to 538.

(*f*) *Third Friday* (Women). Paraphrase 'Coriolanus,' Act I., Scene i., Lines 14 to 25.

X. SELECTED GOVERNMENT QUESTIONS.

FIRST YEAR.

SECOND WEEK.

1. Write a Large hand copy of '*Analytical Chemistry.*'

Write a Small hand copy of '*Throw physic to the dogs.*'

2. Write from Dictation :—

'Religion exalts men because it connects them with God : and rulers least of all can afford to neglect anything which will make them more perfect. Especially is religion necessary in a democracy. The power of a people is greater than that of a monarch, and they are less controlled either by force or opinion. Only religion can keep them in mind of their responsibilities to their fellow men. When the State and its laws are invested with a sacred character, men will be more solicitous to bequeath them inviolate and intact to their successors.'

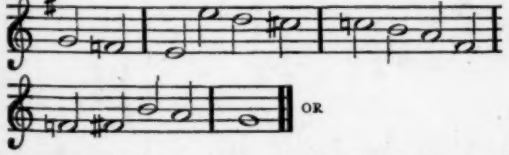
3. In what order should the mental faculties of children be called into exercise? Point out especially the objects which should be kept in view in the training of infants, as distinguished from elder children.

4. What is meant by the faculty of attention? How does it operate, and how far is its exercise an act of the will? Mention some devices by which a teacher can strengthen in his pupils the habit of close attention.

5. Write the supertonic of Key B♭, the subdominant of Key F, the dominant of Key A, the leading note of Key G, and the submediant or superdominant of Key D. Or name the following intervals—

t s l t d' f f l
(1) (2) (3) (4) (5) (6) (7) (8)
r t_1 r f m t_1 r fe.

6. Transpose the following a minor second higher, viz., into the Key of A♭.



OR

Rearrange the following notes in order of pitch, placing in each case the lowest note first :—

(*a*) s d_1 m r' t_1 fe d s_1 ta_1 l_1 r
(*b*) ta_1 m r' f t_1 fe l d m s l.

7. Write an essay upon the characteristics of '*Coming of Arthur*' or '*The Princess.*'

8. (*Women only.*) Analyse and parse from Article.

(*Men only.*) Analyse the following and parse the words in Italics. *It* appeareth in nothing more, *that* Atheism is *rather* in the lip *than* in the heart of man, *than* by this, that Atheists *will* ever *be talking* of that their opinion, *as if* they fainted in it within themselves, and would be *glad to be strengthened* by the consent of others.

9. What are the principal ways in which mountains affect the climate of a country?

10. Draw a map as per Routine.

11. Describe the Industries of Canada OR the Salt Lakes of Asia.

12. What advances in colonisation did the British make in the seventeenth century?

13. What do you know of Odo of Bayeux, William Fitz-Osbert, Roger Bacon, Jack Straw, Campeggio, and Schomberg?

14. If I transfer £1,000 from 3 per cent. stock at 92 to a 4 per cent. stock, and gain £1 5s. in income, find the price of the latter stock. Ans. £117$\frac{7}{11}$.

15. If a piece of silk cost £15 15s. 2½d., and the number of yards in its length is the same as the number of pence in the cost of a yard, what is the length and the price per yard?
Ans. 61½ yards ; 5s. 1½d.

16. (*Men only.*) The radius of a circle is 10 inches, and the angle subtended by an arc at the centre is 72°. Find the length of the arc. Ans. 12·5664 inches.

(*Women only.*) Cut out in paper, and make up one leg of a pair of drawers for a child of from three to five years of age.

17. (*Men only.*) Find the radius of a circle such that the area of a segment corresponding to an angle of 90° may be 50 square feet.
Ans. 13·236 feet.

(*Women only.*) A field of grass is rented by two persons for £27 ; one keeps in it 15 oxen for 10 weeks, and the other 49 sheep for 7 weeks. What rent must each pay if 7 sheep eat as much as 3 oxen? Ans. £13$\frac{7}{8}$; £13$\frac{1}{8}$.

18. (*Men only.*) Solve $x^2 + \sqrt{x^2 + 3x + 7} = 23 - 3x$.
Ans. $3, -6, -\frac{3}{2} + \frac{1}{2}\sqrt{125}$.

(*Women only.*) Distinguish the different materials used for clothing as conductors or non-conductors of heat.

19. (*Men only.*) A boat's crew can row 8 miles an hour in still water. What is the speed of a river's current if it take them 2 hours and 40 minutes to row 8 miles up and 8 miles down?
Ans. 4 miles per hour.

20. (*Men only.*) Equal triangles upon the same base and upon the same side of it are between the same parallels. Bisect a given triangle by a straight line drawn from a given point in one of its sides.

(*Women only.*) Give some hints as to a Pupil-Teacher on the subject of cheap clothing, with reference to wear and cleansing.

21. (*Men only.*) Show that the propositions 2 and 3 of the Second Book are special cases of Proposition 1. What are the corresponding algebraical formulæ for these three propositions?

FOURTH WEEK.

1. Write a Large hand copy of '*Volcanically Extinct.*'

Write a Small hand copy of '*Low grumbling out loquacious croaks.*'

2. Write from Dictation : 'Social life alters the nature of man, and consequently his aims and position, by the new passions which it creates. Above all it destroys that indifference to everything but his own freedom, which is the characteristic of natural man. Man in society is marked by deceit and levity in his conduct and demeanour ; he is clever without wisdom ; honour takes the place of virtue ; amid all his pleasures he finds no happiness. Inequality, which in a state of nature hardly exists, acquires its force and development from our capabilities.'

3. Describe the cause and the cure of the habit of vague and inaccurate observation.

4. What is the exact meaning of each of these words :—*Reminiscence, Recollection, Memory?* Give some simple practical rules with reference to the character and right use of memory exercises in schools.

5. Write down under each of the following intervals its name :—

OR

What circumstances tend to modify the mental effects of scale notes?

CERTIFICATE ROUTINE FOR OCTOBER 1894 (MEN AND WOMEN, FIRST YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	Notes of a Spelling Lesson to Standard III.	Read Bacon's Essays, 16, 17, 18, 19 *or* 'Life of Byron,' pp. 26 to 44	Euclid, Book III., Props. 1 to 19 *or* Repairing Underclothing	Rewards and Punishments	Read Bacon's Essays, 21, 24, 25, 27 *or* 'Life of Byron,' pp. 45 to 62	Euclid, Book III., Props. 19 to 37 *or* Diagram of a Pair of Drawers	Sequence of Intellectual Development	Analyse, etc. (*See Article*)	Euclid, Book I., Props. 1 to 26 *or* Any Needlework	The range of the Teacher's Influence	Analyse, etc. (*See Article*)	Euclid, Book I., Props. 26 to 48 *or* Questions on Needlework
TUESDAY	Chief Dates from 1066 to 1135	Division into Proportional Parts	Climates of N. America *or* Geography of Japan	History from 1510 to 1558	Mensuration of the Circle *or* Vulgar Fractions	Winds and Currents	Chief Dates from 1135 to 1216	Discount *or* Decimals	Productions of N. America *or* Geography of Russia in Asia	History of Colonial Development	Division into Proportional Parts	Geography of N. American Islands *or* China
WEDNESDAY	Fractions and Surds of Algebra *or* Composition of Food	Magna Charter, Habeas Corpus, Declaration of Rights	General Principles of Teaching	Measures and Multiples of Algebra *or* Functions of Food	Cube Root *or* Theory of Repeaters	Music — Key Relationship	Ratio, Proportion, and Variation of Algebra *or* Organs of Digestion	Square Root *or* Simple Interest	Euclid, Book II. *or* Cutting-out of a Woman's Chemise	Arithmetical Progression *or* Care of Clothing	Mensuration of Triangles *or* Compound Interest	Tides. Causes which affect Climate
THURSDAY	History from 1651 to 1674 *or* Revision	Geometrical Progression *or* Nutritive Value of Food	Maps of Ontario and Quebec *or* Palestine	History from 1674 to 1700 *or* Revision	Harmonical Progression *or* Organs of Mastication	Religions, Races, Languages, and Governments of N. America *or* Geography of Corea	History from 1559 to 1600	Problems involving Simple Equations *or* Materials of Clothing	Maps of Nova Scotia and New Brunswick *or* China	Constitutional History of 17th Century	Problems involving Quadratics *or* Use of Clothing	Mountains and Rivers of N. America *or* Geography of South-Eastern Asia
FRIDAY	Musical Terms and Signs	Deductions on Euclid, Book I. *or* Diagram of a Pair of Drawers	Analysis and Parsing (*See Article*)	Most important Laws of the Period *or* Dynastic Tables	Deductions on Euclid, Book II. *or* Cutting-out of a Woman's Chemise	Briefly write out substance of Bacon's Essays, 28 and 29 *or* 'Princess,' Canto VII. and Conclusion	Music — Major Scales *or* Chordal Structure of the Major Scale and Mental Effects of the Notes	Deductions on Euclid, Book III. *or* Any Needlework	Read 'Coming of Arthur' *or* 'Princess,' pp. 61 to 90	Compound Interest	Any Revision. Music — Diatonic Intervals	Read Notes of 'Coming of Arthur' *or* 'Princess,' pp. 90 to 120
SATURDAY	How to teach Arithmetic	Repetition, Penmanship, etc.	Examination *or* Revision	How to train the Hand	Music — Changes of Key and Removes. Bridge Notes	Examination	Notes of a Lesson on Freehand Drawing to Standard IV.	Repetition, Penmanship, etc.	Examination *or* Revision	Syntax of Verbs	Repetition, Penmanship, etc.	Examination

CERTIFICATE ROUTINE FOR OCTOBER 1894 (MEN AND WOMEN, SECOND YEAR).

DAYS	FIRST WEEK.			SECOND WEEK.			THIRD WEEK.			FOURTH WEEK.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.	I.	II.	III.
MONDAY	The Processes of Reasoning (Jevon's Logic) *or* ('Cartwright's 'Mental and Moral Science')	Read Introduction to 'Hamlet,' pp. 21 to 30 *or* Notes of 'Coriolanus,' pp. 193 to 205	Euclid, Book VI., Props. 12 to 17 *or* Tucking and Marking with Cross-stitch	Health of Teachers and Scholars (Carpenter's Hygiene)	'Study Hamlet,' Act I. *or* 'Coriolanus,' Notes pp. 205 to 213	Euclid, Book I. *or* Diagram of a Woman's Night-dress	'Quick,' Chapter XIII.	Read Bacon's Essays, 21, 24, 25, 27 *or* 'Spenser,' Chapter I.	Euclid, Book II. *or* Hedge-tear and Cross-cut Darns	The Half-Time Register and 'Form IX.'	Read Bacon's Essays, 28, 29, 30, 31 *or* 'Spenser,' Chapter II.	Euclid, Book III. *or* Write down directions for making a Woman's Night-dress
TUESDAY	As in First Year *or* History from 1485 to 1509	Continued Fractions *or* Stocks	As in First Year *or* General Physical Geography of England	As in First Year *or* History from 1509 to 1547	Discount	As in First Year *or* Political Geography of England	As in First Year *or* Dates from 1547 to 1576	Stocks	As in First Year *or* Physical Geography of Australia	As in First Year *or* History from 1576 to 1603	Proofs of Fractional Operations	As in First Year *or* Political Geography of Australia
WEDNESDAY	Musical Terms	Binomial Theorem *or* Bread and Paste Making	Formation of Habits and Character	Logarithms *or* Puddings for the Sick	Compass and Registers of Voices	Paraphrasing (*See Article*)	Interest (Algebra) *or* How to detect Food Adulteration	Algebraic Arithmetic *or* A Schoolmistress's Expenditure	Interest (Algebra) *or* Investments	Diatonic Intervals *or* Names of Chromatic Tones	Binomial Theorem *or* Economy of Food	As in First Year *or* Geography of Australia
THURSDAY	As in First Year *or* Dates from 1485 to 1547	Problems on the work of Mixed Agents	As in First Year *or* Map of Great Britain between Forth and Ouse Clyde and Mersey	As in First Year *or* Lives of Great Men of the Tudor Period	Equation of Payments	As in First Year *or* Geography of New Zealand	As in First Year *or* History from 1547 to 1576	Major Scales *or* Major and Minor Modes	As in First Year *or* Map of Tasmania	As in First Year *or* Poets of the Tudor Period	Surds *or* Compound Proportion	As in First Year *or* Geography of Scotland or Ireland
FRIDAY	Binomial Theorem *or* Diet for Convalescents	Deductions upon Euclid, Book IV. *or* Diagram of a Woman's Night-dress	Analyse, etc. (*See Article*)	Logarithms *or* Proper seasons for the various Meats	Euclid, Book VI., Props. 1 to 17 *or* Cutting-out of a Child's Muslin Pinafore	Paraphrasing (*See Article*)	Permutations and Combinations *or* The Ordinary Beverages	Definitions of Euclid, Book V. *or* Making of a Child's Muslin Pinafore	Paraphrasing (*See Article*)	Interest and Annuities *or* Symptoms of the Ordinary Diseases	Deductions upon Euclid, Book VI. *or* Making of a Child's Muslin Pinafore	Describe the characters of 'Horatio' and 'Laertes' *or* 'Cominius'
SATURDAY	School Premises — Ventilation and Water Supply	Repetition, Penmanship, etc.	Examination *or* Revision	Notes of a Lesson on Simple Analysis to Standard V. *or* On the Square, for Infants	Map of Ireland.	Examination	Rewards, Punishments, Emulation, and Example	Repetition, Penmanship, etc.	Examination *or* Revision	'Quick,' Chapter XVI.	Map of Australia	Examination

6. Write down the *air* of 'GOD SAVE THE QUEEN' correctly in either notation.

7. Write out a summary of Bacon's *Fourth Essay* OR of the Prologue of '*The Princess*.'

8. Write brief notes on (*Men*) *Almesbury, Dubric, Sir Ulfius, Le Mort Arthur, Lyonesse* and *Gorlois*, OR (*Women*) *Jedwood Justice, Voltaire*, '*Correctness in Poetry*.'

9. Prepare the outline of a *first* lesson on the Preposition.

10. Explain the phenomena of Rain, and give instances of rainless regions, and regions of excessive downpour. How is the rainfall measured?

11. Draw a map as per Routine.

12. Explain shortly the circumstances which led to the formation of the Quadruple Alliance against Louis XIV. at the close of William III.'s reign. Why is Blenheim regarded as one of the decisive battles of the world? State the principal conditions of the Peace of Utrecht.

13. (*Men only.*) Name six authors (with their principal works) who were living between 1603 and 1620.

(*Women only.*) What is meant by '*Imperial Federation*'? What advantages or disadvantages do you see in Australia or Canada becoming independent of the Mother Country?

14. (*Men only.*) $x^2 + 2ax = b^2 + 2ab$. Ans. $b, -(2a + b)$.

(*Women only.*) Describe the various kinds of darns and their use as to a Pupil Teacher.

15. (*Men only.*) Show that if any integer be put for x in the expression $x^6 - 4x^5 + 14x^4 - 32x^3 + 49x^2 - 60x + 36$, the result will be a square number.

(*Women only.*) Give directions for the cutting out of an infant's shirt, observing the due proportions and economising the material.

16. If the ratio of threepenny to fourpenny pieces in a given sum which consisted only of these coins was altered from 3 : 7 to 7 : 3, the sum would be diminished by £20. Find the sum.
Ans. £185.

17. (*Men only.*) A person selling apples at three for a penny gains 5 per cent. Find the gain or loss per cent. when 25 are sold for sixpence. Ans. $24\frac{3}{4}$ loss.

(*Women only.*) Goods are bought for £250, and one quarter of them is sold at a profit of 15 per cent. At what profit per cent. must the remainder be sold to obtain a profit of 20 per cent. on the whole? Ans. $21\frac{3}{4}$.

18. (*Men only.*) All the exterior angles of any rectilineal figure, made by producing the sides successively in the same direction, are together equal to four right angles.

(*Women only.*) Explain the process of mastication, and describe the common causes of indigestion.

19. (*Men only.*) PQR is an equilateral triangle; H, K are points in QR, PR, such that QH = RK. Also QK, PH intersect at S. Show that the angle PSQ is 120°.

(*Women only.*) What evils result from an excessive use of tea and coffee?

SECOND YEAR.

SECOND WEEK.

1. As in First Year.

2. As in First Year.

3. What is understood by a Proposition, a Premiss, a Conclusion, and a Syllogism? Give an example of each.

4. As in First Year.

5. As in First Year.

6. As in First Year.

7. Quote from '*Hamlet*' or '*Coriolanus*' any striking examples of the use of figurative language under the heads of (*a*) Simile, (*b*) Metaphor, (*c*) Personification.

8. See Routine, Third Hour, First Friday.

9. (*Men only.*) As in First Year.

(*Women only.*) Outline the History of Australia, and describe the present system of Government.

10. (*Men only.*) As in First Year.

(*Women only.*) Where and what are '*Ardrossan*,' '*College Green*,' '*The Strand*,' '*Great Barrier*,' '*Torrens*,' and '*Waikato*'?

11. As in First Year.

12. (*Men only.*) As in First Year.

(*Women only.*) Enumerate the causes and describe the excesses of Henry VIII.'s despotic power.

13. (*Men only.*) Prove that the sum of the squares, any number of unequal quantities, is less than the square of their sum.

(*Women only.*) Draw a diagram on sectional paper of a woman's nightdress.

14. (*Men only.*) In an examination it was found that the aggregate marks of each candidate came to the same amount. The examiner then assigned to each the square of the marks gained by him for each subject. Prove that if one candidate, and one only, was totally ignorant of every subject but one, he would come out head of the list.

(*Women only.*) Cut out in paper the left half of a boy's shirt.

15. (*Men only.*) Find the radius of a cylinder whose volume is 10,000 c. inches, and height 50 inches. Ans. 7·979 ins.

(*Women only.*) As in First Year.

16. (*Men only.*) Find how long it will take to fill a hemispherical tank of 10 feet diameter, from a cistern which supplies by a pipe ·1 gallon per second. Ans. 4 hrs. 32 mins.

(*Women only.*) As in First Year, Question 17.

17. (*Men only.*) Construct a triangle whose sides are equal to three given straight lines, any two of which are together greater than the third.

Show by diagrams what would happen if you attempt to construct triangles whose sides contain units in the following relations:—(*a*) 2, 3, 4; (*b*) 2, 3, 5; (*c*) 2, 3, 6.

(*Women only.*) Compare the value of beef, mutton, veal, poultry, and fish under the heads of nutrition and economy.

18. (*Men only.*) If a straight line falling on two other straight lines make the alternate angles equal to one another, or make the interior angles on one side together equal to two right angles, these two sides shall be parallel.

Show that a four-sided figure, which has all its sides equal and *one* angle a right angle, is a square.

(*Women only.*) Explain the terms:—*incisors, trachea, insalivation, asphyxia, capillaries, automatic.*

FOURTH WEEK.

1. As in First Year.

2. As in First Year.

3. What do you mean by the *converse* of a proposition? Give some examples. Are there any cases in which the *converse* is necessarily true?

4. What is meant by *Induction*? Sketch out a Lesson in which the *inductive* method is employed, taking one of these subjects:—(*a*) Passive Verbs, (*b*) The properties of water, (*c*) Climate.

5. As in First Year.

6. As in First Year.

7. Paraphrase as per Second Friday in Routine.

8. Mention any anachronisms in '*Hamlet*' or '*Coriolanus*.'

9. (*Men only.*) As in First Year, Question 11.

(*Women only.*) Draw a Map of Queensland.

10. (*Men only.*) As in First Year.

(*Women only.*) Name the chief seaports of British Australasia, with the province to which each belongs, and their chief exports and imports.

11. (*Men only.*) As in First Year, Question 13.

(*Women only.*) Describe briefly the state of Ireland under the Tudors.

12. (*Men only.*) As in First Year.

(*Women only.*) Describe any foreign military expeditions from 1485 to 1602.

13. (*Men only.*) Enunciate (*not prove*) the Binomial Theorem, giving the rules for the signs, co-efficients, powers and number of terms of a positive index.

(*Women only.*) Write brief lives of Wolsey and Mary I.

14. (*Men only.*) How many different numbers can be formed by using one or more of the figures 1, 2, 3, 4, 5? Ans. 120.

15. (*Men only.*) If a sphere of lead, 4 inches in diameter, weighs 221·3 ounces, find the weight of a sphere of lead 5 inches in diameter. Ans. 432·227 ounces.

(*Women only.*) Two boats start to row a race at 3 o'clock. The race is over at 6⅔ mins. past 3, the losing boat being 40 yards behind at the finish. At 4 mins. past 3 this boat was 700 yards from winning post. Find the speed of each boat in miles per hour.

Ans. $9\frac{2}{3}\frac{0}{8}\frac{7}{4}$; $9\frac{2}{3}$.

16. (*Men only.*) Find the length of a cube which shall be equivalent in volume to a sphere 20 inches in diameter.

Ans. 16·12 inches.

(*Women only.*) As in First Year.

17. (*Men only.*) What are the three main steps in the Demonstration of Euclid IV. 10? PQR is such a triangle; the base angles are bisected by QST, RSV, which meet the circle described about the triangle at T and V respectively. Show that the figure PTSV is a rhombus.

(*Women only.*) Mention the common defects in house-drainage in (*a*) towns, (*b*) the country. What ill effects will arise where a house is not effectually drained?

18. (*Men only.*) As in First Year.

(*Women only.*) Explain the qualities and uses of (*a*) borax, (*b*) soda, (*c*) ox gall, (*d*) chloride of lime.

CORRESPONDENCE.

We shall be pleased to reply briefly through these columns to any SUBSCRIBER *seeking examinational information or advice, and* **Enclosing the Necessary Coupon.**

This privilege does not, of course, extend to furnishing the solutions and answers of problems. All such communications should be addressed to 'THE QUERY EDITOR.'

Replies demanding urgency will be promptly forwarded per post on the receipt of a stamped and addressed envelope, **Accompanied by the Requisite Coupon.**

A post will be saved by writing direct to GEORGE BEACH, STANLEY MOUNT, MACCLESFIELD.

W.H.N. (Strood).—(1) Quick's 'Educational Reformers,' from Longmans. (2) Not necessary to give special notice.

T.H.G. (Cwm Cnu).—(1) You can sit at Christmas. (2) By the time this reply is published. (3) Before 1st October.

H.H. (Bollington).—Many thanks for your kind correction of Algebra Solution.

W.M. (Coatbridge).—(1) Simultaneous Quadratics will be required. (2) The Astronomical questions will be of an easy kind.

C.G.B. (Pendleton).—I cannot understand the Department's reply. It is in flat contradiction to the reading of the Syllabus and to precedents. Many thanks.

E.T. (Prideaux).—I am greatly obliged. The Post Office authorities do not seem to know their own minds. Our readers will be interested in learning that '*Needlework is not admissible by Book Post, and is charged letter rate.*'

E.M. (Wisbech).—No stamped envelope was enclosed. The Department publish all the Certificate Questions.

ANSWERED PER ORDINARY LETTER.—A.S. (Cheetham); P.F. (Southsea); M.T. (Harpurhey); W.H. (Greenhill); E.J.L. (Todhills); A.A. (South Shields); PATER (Caulden Lowe); H.W. (Chesterfield); M.H. (Beverley); R.J.G. (Halesworth); F.H. (Grimsby); H.W. (Earlsden); N.M. (Milford); W.V. (Annesley); W.J.G. (Haithwaite); T.H.G. (Grisca Cross); H.H. (Bollington); E.H.C. (Scarning); A.M. (Lowestoft); H.T.B. (Northampton); E.E.B. (Brierley Hill); W.R.J. (Nantlle); G.L. (Crumlin); H.R. (Barmouth); S.W. (Linlithgow); A.L. and M.C. (Cape Colony); T.W. (Grays); M.T. (Penrith); H.H. (Hoyland); A.L.M. (Passford); A.P. (Leicester); M.R. (Uttoxeter); C.F. (Ipswich); T.H.O. (Highgate); T.J. (Treorky).

CONVERSATIONAL LESSONS IN CHEMISTRY.

BY THOMAS CARTWRIGHT, B.A., B.SC. (LOND.),

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For particulars of the List of Chemicals and PRACTICAL TEACHER Set of Apparatus for working the experiments referred to in these lessons see numbers for January and February 1893.

LESSON XVII.—METALS.

What is this body? Iron. And this? Copper. And this? Silver. And this? Gold. And this? Zinc. And this? Lead. And this? Mercury, or quicksilver. And this? Ah! now we are getting a little out of the way. Well, it is tin. What is this powder? You will remember that we powdered it when we were dealing with chlorine. Well, what is it, Tom? It is antimony, sir. Yes; and what is this that I can cut so easily? It is either sodium or potassium, sir. Quite right, Bob. Here is a curiosity in the shape of a medal. Feel it, Trixie. What have you to say about it? How very light it is, sir. Yes; pass it round that all may note this. Now, what is the name of this light substance? It is aluminium, is it not, sir? Yes; and on account of its lightness it would soon become a great favourite with artificers. It is, however, very difficult to separate it, and consequently it is too dear for anything like general use. Very good; we have examined quite enough specimens, and we will now proceed to see what our examination has taught us. First of all, what is the name that is given to all these substances? They are metals, sir. Yes, they all bear that name, and we will try to discover in what respects they resemble each other. Now, carefully observe all the specimens in order to find out in what they agree. Bob shall answer first, as he seems so anxious. They all shine, sir, when they are polished. Very true; that will do for a start. Proceed. As you seem to be in somewhat of a quandary I will help you. Here are two rods of the same size, one of iron, the other of wood. Put both in the fire, Annie, and keep your hands on the ends remote from the fire. What difference do you perceive? The hand holding the iron rod is warmer than the one holding the wooden one. Why? Because the iron passes the heat up and the wood does not. Very true; and we express this fact by saying that metals conduct heat through their substances, whereas non-metals, as a rule, do not. I say as a rule, because we shall find exceptions to this. Again, what is the difference between our specimens and glass? Go on, Minnie. Glass is transparent, sir, and all the metals are opaque. Yes, but even this is not absolutely true, as gold, when hammered out very thin, will permit some rays of light to pass through. Of this we need take little notice. Now, go back to the chapter on oxides, and try to remember something bearing on this subject that was proved then. Very good; you shall tell us, Ernie. We proved, sir, that non-metals, as a rule, produced oxides which are soluble in water, and which, when added to water, formed acids. On the other hand, when oxygen combines with metals the bodies produced do not dissolve in water, and when they are added to acids they neutralise the acids, the neutral bodies formed being known as salts. Yes; I am glad to see that you understand that so nicely. What do we call those metallic oxides, Fred? We call them bases, sir. Now, let us sum up and get a clear idea of what a metal is. You, Maud, shall put the matter right for us. A metal is an opaque body that has lustre, that conducts heat and electricity, and unites with oxygen to form a base. Exactly; now I will tell you a few facts which will show you that this division is only a rough one. What have I in this bottle, Joe? Iodine, sir. Is it a metal or a non-metal? Look before you speak. I feel sure that it is a non-metal, sir, but yet it has lustre. You are right. Now turn to the voltameter that we used for the electrolysis of HCl. Of what are the terminals composed? Of carbon, sir. Is carbon metal or non-metal? It is a non-metal, sir, although it is like a metal in being able to conduct electricity. Yes; and one sort of carbon has lustre. Name it, Harry. Graphite, sir. Furthermore, some of the metals produce acid-forming oxides; so that you see I was right when I told you the division was a rough one, as, indeed, all natural divisions are. If there are beings concerning which we cannot with certainty affirm whether they are animals or vegetables, we must not be surprised to find bodies that cannot in strictness be classified either with the metals or with the non-metals. All the metals are elements, as we learnt in one of our earlier lessons. Now for an experiment. Place some mercury, Frank, in an evaporating dish and apply heat thereto. Now place a pellet of sodium in the heated mercury. Note the hissing, showing that heat has been developed. From this you would argue that what had taken place, Charlie? Chemical combination, sir. But if I told you that there is no fixed proportion between the weights of the Na and Hg that will add themselves

to each other? Then I should have to say that it was a mixture. But surely some of you can remember a better name for this? Ah, I thought so. Go on, Mabel. Wouldn't it be an alloy, like brass, sir? Yes; and when mercury is one of the elements forming the alloy we say that an amalgam is formed. It is highly probable that an alloy is both a compound and a mixture; that the two metals combine together and then the compound formed is intimately mixed with the metal that is in excess. As a soft metal is frequently hardened by alloying it with another metal, the process is a very useful one. Thus, gold coins consist of gold and copper; silver coins are an alloy of silver and copper, and brass is an alloy of copper and tin; solder is an alloy of tin and lead. You can all tell me that metals are dug out of the earth, I know. Can you, however, tell me in what condition they are found, *i.e.*, are they found free or in combination? Well, Willie? Sometimes free, but more often in combination. True; proceed to name some of each class. Gold, I know, is found native, sir. Yes, and so are silver, copper, and bismuth, but much more rarely. What do we call the combination of a metal with something else, as it is found in its natural state? We call them ores, sir. Quite true; and now proceed to tell me what are the commonest ores. I should think they would be the oxides. Yes, and the sulphides; and the question is how to get rid of the O and the S. What substance is used to effect this? Coal and coke. Why not say carbon at once? And why should this happen? Would it not be because of the greater affinity of C for O as compared with the metal? Then, why should the great heat of the blast-furnace be necessary? I can answer that question, sir. Do so, then. The heat gives the carbon a greater and greater power of combination, until at last it is able to combine with the O and set the metal free. Just so; and it is worthy of remembrance that carbon, inert as it is at low temperatures, becomes wonderfully active at the high temperature of the blast-furnace, showing us how much the properties of bodies depend upon the conditions under which the bodies exist. With sulphates heat alone is the separator.

There are many ways of classifying the metals. The one most commonly resorted to is that depending upon the behaviour of their oxides.

Na, K, Li, as you know, form oxides, soluble in water and forming a strongly alkaline solution. Hence these metals are known as *the metals of the alkalis*, constituting Group I. in our scheme of division. Barium, strontium, calcium, magnesium—so useful in your firework displays—have oxides slightly soluble in water, to which they give a faint alkaline reaction. They also resemble the following group (III.) in so far as they are nearly insoluble. Now, the chief member of the next group is aluminium. What is the source of this metal, John? We learnt in our last lesson, sir, that it was obtained from clay. Yes; and clay is got from the earth; is it not so? And so Al may be called the metal of the earth, and Group II. will be the metals of the alkaline earths, thus showing the connection between the three groups.

Then we have (IV.) the Iron Group, including manganese, chromium, uranium, cobalt, nickel, zinc. Group V. includes lead and copper, with some rarer metals. Group VI. consists of the heavy precious metals—gold, silver, mercury, platinum, and several others.

Summing up, we have:—

Group I. The metals of the alkalis—Na, K, Li.

Group II. The metals of the Alkaline Earths—Ba, Sr, Ca, Mg.

Group III. The metals of the earths, of which we need simply give Al.

Group IV. The Iron Group—Fe, Cr, Ni, Co, Zn, Mn, U.

Group V. The Lead Group, of which we need mention only Pb and Cu.

Group VI. The noble metals, of which we need mention only Au, Ag, Hg, Pt.

In conclusion, note that the name of all these elements ends in *um* (for zinc, &c., read zincum), and 'um' is thus taken as a terminative indicative of a metal. With that remark we bring this somewhat long lesson to a speedy close.

NOTES ON 'MADEMOISELLE DE LA SEIGLIÈRE.'

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(*First Class French Honours.*)

The figures at the beginnings of the lines refer to the pages and lines of Macmillan's Edition (Foreign School Classics, 1s. 6d.). Thus 4.16 means p. 4, l. 16. As we quote the acts and scenes also, it should be possible for a student using any other edition to use these notes with advantage.

ACT II.—SCENE 4.

33.33.—*le Code Napoléon.* The civil laws of France were codified by Napoleon. Hence the name *Code Napoléon.* This code forms the basis of the present French law. After the Restoration, the name was changed to *Code Civil.* There is a reference to this in 34.32.

33.34.—*assez sec*, rather dry. *Sec* from Lat. *siccus*, dry.

33.34.—*très-goûté*, much appreciated. *Goûter* from Lat. *gustare*, to taste.

34.2.—*que vous en aimiez beaucoup le chapitre des donations entre-vifs*, that you would much like the chapter on gifts of property made between living persons (*entre vifs*, among living persons; in our legal phraseology, *inter vivos*).

34.8.—*du vivant*, during the lifetime.

34.9.—*moitié*, noun fem. sing., half. Lat. *medietatem.* But adj. 'half' is *demi*, and adv. 'half' *à demi, à moitié.*

34.12.—*chez vous*, in your own house.

34.13.—*vous faire assigner en restitution de titres*, to sue you for the recovery of his property.

34.15.—*déguerpir*, vb. inf., pack up and be off; clear out. The term is a forcible colloquialism.

34.19.—*Je ne me soucie pas mal de*, I do not care a bit for. The use of *mal* in this sense is colloquial.

34.20.—*Que parlez-vous d'ailleurs de donation?* Beside, why do you speak of gift?

34.27.—*ventre-de-loup* (lit. wolf's belly; Lat. *venter* and *lupus*), another of the Marquis's 'strange oaths.'

34.28.—*vaurien*, good-for-nothing fellow (*vau* from *valoir*, to be worth; and *rien*, nothing).

34.32.—*qui se dit civil, je crois, l'impertinent*, which is called 'civil,' I believe, but which I should call impertinent. See 33.33.

34.34.—*Jusqu'ici*, up to the present. *Jusque* from Lat. *de*, from, and *usque*, as far as.

34.36.—*ne me permet plus de ménagements*, no longer permits me to spare you, *i.e.* compels me to tell you the plain unvarnished truth. The verb *ménager* and noun *ménagement* are used in French in the sense of having consideration for a person's feelings, dignity, etc.

35.2.—*bel et bien*, purely and simply.

35.2.—*qu'il vous a faite*, which he has made you. The past part. is fem. sing. as it agrees with the dir. obj. *que* (= *donation*) which precedes it.

35.5.—*Voilà pour le passé*, so much for the past; we have now done with the past.

35.6.—*n'arrive ici*, will arrive here. *Ne* is required after *nul* (*nul doute*).

35.7.—*en solliciteur*, as a petitioner. Notice this peculiar meaning of the preposition *en* (= 'in the character of').

35.12.—*comme Saint Thomas*, like St. Thomas, the incredulous apostle of Jesus. See St. John xx. 24–30.

35.17.—*l'étude de l'huissier*, the office of the solicitor. A solicitor's office or chambers is called his *étude.* *Huissier* is lit. 'usher' (Lat. *ostiarius*, door-keeper).

35.21.—*à livrer les clefs de la place*, to give up the keys of the fort. *Place* is a technical military term.

35.23.—*saute-ruisseau*, errand-boy. Lit. one who jumps the gutters (*sauter*, to jump; *ruisseau*, gutter).

35.24.—*qui a tout vu*, who saw everything. *Tout* and *rien* as dir. obj. of a transitive verb are placed between the auxiliary and the past participle.

35.27.—*tiens, tiens*, imperat. sing. of *tenir*, hold. Translate, why! why!

35.33.—*comptez-vous?* do you intend? Like *vouloir, pouvoir, oser*, etc., *compter* is followed directly by the infinitive.

36.4.—*je n'aurais pas à jeter ma canne par la fenêtre.* This refers to an anecdote told of Louis XIV. Being enraged with one of his courtiers, he was about to strike him with his cane, when he remembered that the courtier was a nobleman; to deliver himself from the temptation of inflicting an indignity on a man of good birth, the king threw his cane out of the window. The Marquis means that as Bernard Stamply was not a gentleman, he would be under no obligation to restrain himself from thrashing him.

36.7.—*plaider*, vb. inf., go to law.

36.11.—*J'y mangerai mon dernier champ*, I will sell my last field to find the money. *Manger* is often used in the general sense of *spend, waste, squander*.

36.15.—*Vous avez un blason; vous ne lui ferez pas cette injure.* You have a coat of arms; you will not inflict that dishonour on it.

36.25.—*cire*, noun fem. sing., wax. Lat. *cera*.

36.28.—*rapport*, noun masc. sing., connection.

36.30.—*C'est ainsi qu'il faut nous y prendre*, it is thus we must go to work.
S'y prendre = set about something; go to work.

37.1.—*qui s'attend à*, which expects to. *Attendre* = wait for; *s'attendre à* = expect.

37.4.—*pressent*, pres. ind. 3rd sing. of *pressentir*, expect.

37.5.—*Gardez-vous de discuter*, be sure you do not discuss.

37.9.—*Le temps et moi, nous ferons le reste.* Time and I will do the rest. When a subject is compounded of a noun or pronoun, or two pronouns, a *resuming* pronoun (here *nous*) is used after the second subject. Only conjunctive pronouns (*nous, ils*, etc.) are used as resuming pronouns.

37.12.—*m'y prendre autrement que le Béarnais*, to go to work in a different fashion from the *Béarnais*. The *Béarnais* was the Protestant king Henri IV., who had to quell civil discord before he became firmly seated on the throne.

37.15.—*Le Béarnais était d'avis que Paris valait une messe.* The *Béarnais* was of opinion that Paris was worth a mass. Henry's difficulties, alluded to above, arose partly from his being the Protestant monarch of a country in which the Roman Catholic religion was predominant. From motives of diplomacy he abjured Protestantism. He made use, on this occasion, of the historic phrase *Paris vaut bien une messe* ('Paris is well worth a mass').
The meaning of the Baroness is that the Marquis, like Henry IV., should show himself diplomatic and disposed to compromise.

37.17.—*Passe pour une messe.* A mass is all very well.

37.27.—*vient de passer*, has just passed.

37.29.—*tout de son long sur un million de propriétés*, at full length on property worth a million (of francs).

37.33.—*s'il vous reste*, if there remain to you. *Il* is used impersonally here.

37.34.—*de fond en comble*, from top to bottom; utterly.

37.35.—*castel*, castle. An antiquated word.

38.1.—*en liesse*, at his ease. *Liesse* (Lat. *lætitia*, joy) is a word obsolete except in this phrase.

38.2.—*menant grand train*, living in good style.

38.5.—*une Médecis*, a Medici. The Medici were a Florentine family, who gave two queens to France. Both of these were noted for their skill in intrigue and diplomacy.

38.10.—*Mais vous, mais votre belle Hélène, mais les enfants . . .* what about yourself, your beautiful Helena, the children. . . . Notice this emphatic use of *mais*.

38.12.—*C'est vrai, pauvres petits!* It is true, poor little dears! The solicitude of the Marquis for his unborn grandchildren is deliciously comic.

38.12.—*Sauvons le duvet de leur nid*, let us save the down of their nest, *i.e.* let us keep a comfortable home for them.

38.20.—*Assiste*, is present. Lat. *adsistere*.

38.21.—*il déjouera*, he will baffle.

38.22.—*Je vais le jeter par la fenêtre.* I will go and throw him out of the window. When the moment of action arrives, the Marquis forgets the lesson of diplomacy which the Baroness has been at such pains to teach him. Notice how wonderfully consistent throughout the whole action is the character of each personage in this drama.

38.23.—*Y pensez vous?* Is that your intention?

38.24.—*Comment nous en défaire?* How shall we get rid of him?

38.25.—*Je m'en charge*, I will undertake (to do) it.

38.30.—*Au moment de se mettre à table*, just when we were sitting down to table. Read Act I., Scene I. again, and see note above on 38.22.

SCENE 5.

Stage directions.—nouveaux venus, new comers; *avancé des fauteuils*, brought forward arm-chairs.

39.5.—*avant de décliner nos noms et qualités*, before telling you who and what we are.

39.7.—*la place m'est heureuse à vous y rencontrer*, the place is a fortunate one in which I meet you.

39.8.—*galant*, gallant (in a sense of gallantry to ladies); *un galant homme* = a man of honour; *un homme galant* = a man of gallantry towards the ladies.

39.14.—*Ce n'est pas un rustre*, he is not a clown. *C'est* = he is, she is, before (1) a noun; (2) a pronoun; (3) a superlative.

39.23.—*Rien de plus aisé*, nothing more easy. An adjective accompanying *rien, quelque chose, ce que* is connected with it by *de*.

39.24.—*Conventions*, noun f. pl., stipulations, agreement. From *convenir*, to agree.

40.1.—*Vous allez le savoir*, You will know in a short time. *Aller* with the inf. of another vb. expresses an *immediate future*.

40.3.—*de s'en rapporter à mon expérience*, to depend on my experience.

40.5.—*se contenant*, restraining himself.

40.6.—*savourer à longs traits ma vengeance*, drink my vengeance in deep draughts.

40.7.—*de même*, in the same manner, *i.e.* in a whisper.

40.7.—*déguster*, vb. inf., to taste.

40.11.—*il en est un*, there is one.

40.15.—*Il s'en présente une*, There presents itself one.

40.21.—*Au temple de Thémis*, to the temple of Themis. Themis was the goddess of Justice.

40.21.—*Quand il se jouera*, when it is played. The future is used because futurity is intended.

40.22.—*veut bien*, is good enough.

40.26.—*ne me retenez pas*, do not restrain me.

40.30.—*touche de près*, closely concerns.

40.31.—*dont mon client vient l'entretenir*, which my client has come to talk over with him.

40.34.—*à titre d'avocat*, in his quality of advocate; in his professional capacity,

40.35.—*a lieu, je n'en doute pas, d'étonner monsieur le marquis*, is capable, I do not doubt, of astonishing the marquis.

41.1.—*je ne m'explique pas que*, I do not understand why.

41.7.—*vous auriez pu mettre mon procureur aux prises avec votre avocat*, you might have left my lawyer to fight it out with yours.

41.9.—*un caractère particulier*, a private character.

41.11.—*un tiers*, a third party. *Tiers*, m. (Lat. *tertius*) *tierce*, f.

41.14.—*ministère*, noun m. s., services, ministry.

41.16.—*c'est autre chose*, it is quite another matter.

41.24.—*puisqu'il le faut*, since it is necessary.
When *il faut* has a sentence depending on it, the whole sentence represents *what is necessary*. When, as here, *il faut* is used in a simple sentence, *what is necessary* is represented by the pronoun *le*.

41.26.—*nous n'avons plus qu'à nous retirer*, we have only now to withdraw.

41.31.—*ne s'y opposera pas*, will not oppose it (lit. will not oppose himself to it).

42.1.—*quelle langue dorée*, what a smooth tongue. *Langue* from Lat. *lingua*. *Dorée* from Lat. *deauratus*, gilt, golden.

42.2.—*Je réponds de moi*, I answer for myself.

42.8.—*je laisse Renaud dans les jardins d'Armide*, I leave you exposed to the wiles of the enchantress. In Tasso's *Jerusalem Delivered* the Crusader Renaud was long detained by the fascinations of the enchantress Armida.

42.9.—*j'ai tout bien d'espérer*, I have every reason to hope. *Espérer* from Lat. *sperare*, to hope, with prefixed *e*. Compare *esprit* from *spiritus*.

SCENE 6.

42.15.—*veuilles*, imperat. 2nd plur. of *vouloir*. Translate 'Be so kind as.'

42.20.—*d'abord*, to begin with.

42.24.—*que vous avez oubliées*, which you have chosen. *Que* has for antecedent *choses*. For explanation of *oubliées* see 35.2.

42.29.—*voilà un quart de siècle*, a quarter of a century ago. *Siècle* from Lat. *saeculum*. The reference is to the French Revolution, which was hailed, in other countries as in France, as the commencement of a new and happier era for humanity.

42.29.—*de grandes choses*, great things. Lit. 'some great things,' the partitive article (*de* when an adjective precedes the noun) being *always used* in French where 'some' is only understood in English.

43.5.—*sourd*, deaf. Lat. *surdus*.

43.10.—*au prix de ses sueurs*, by the sweat of his brow (lit. 'at the price of his sweat'). *Sueur* from Lat. *sudor*.

43.12.—*recousu*, past part. of verb *recoudre*. Lit. 'sewn together.' Translate 'bought up.'

43.13.—*il s'en dépouilla*, he stripped himself of it.

43.14.—*vous le mit sur les épaules*, put it on your shoulders, *i.e.* gave it to you. The metaphor representing the estate as a mantle is continued.

43.18.—*à un tel excès*, to such an excess. Where we say 'such a(n)' the French say 'a such.' *Tel* from Lat. *talis*, such.

43.23.—*Ce que je sais, moi*. What *I* know. The *moi* following *je* gives it emphasis.

43.24.—*sans s'être seulement réservé*, without even having reserved for himself.

43.26.—*qui ne vous avait coûté d'autre peine*, which had cost you no other trouble.

43.30.—*un pareil langage*, such remarks. *Langage* is style employed in speaking; *langue* is a particular language.

43.33.—*ce qui vous attend*, what is in store for you.

44.9.—*précédemment*, previously. To form an adverb from adjectives ending in *nt* (as *précédent*) the *n* is changed into *m*, and the *t* dropped before *ment* is added.

44.12.—*je suis en cause*, I am concerned; my conduct is called in question.

44.15.—*si vous l'aviez vue poindre*, if you had seen it break.

44.16.—*une aurore de sang*, a dawn of blood. The allusion is to the Reign of Terror.

44.19.—*si l'on venait vous dire*, suppose someone came and told you.

44.21.—*que le plafond criât*, suppose the ceiling creaked. *Que* is often used to avoid the repetition of *si*, if. In such a case it is followed by the subjunctive (*criât, craquât*).

44.24.—*vous empresseriez-vous d'accourir?* would you be eager to go to him? *Accourir* is to run up, to go to some one.

44.26.—*il s'est rencontré*, there have been met.

44.27.—*de nobles cœurs*, some noble hearts.

44.27.—*demeurés français*, (which have) remained French, *i.e.*, loyal to France.

44.28.—*Rocroi n'exclut point Austerlitz*, Rocroi does not exclude Austerlitz. Rocroi was a great victory won by the French over the Spaniards in the reign of Louis XIV. Austerlitz was one of the greatest victories of Napoleon. The meaning of this, as of the next phrase, is that Frenchmen of all shades of politics could feel proud of successes of the French arms, under whatever *régime* they might have been won.

44.28.—*Bouvines et Marengo sont sœurs*. *Bouvines* was a victory won by Philip Augustus in 1214; *Marengo*, a victory won by Napoleon during the campaign in Italy.

44.29.—*le même drapeau*, the same flag. The white flag of the Bourbons was exchanged for the revolutionary tricolour. *Drapeau*, military flag; *pavillon*, naval flag.

44.31.—*une prise de tabac*, a pinch of snuff.

44.33.—*si vous tenez à savoir*, if you wish to know; are determined to know.

45.1.—*qu'il n'a fait qu'obéir*, that he has only obeyed. *N'avoir fait que* followed by inf. = to have only. *Obéir* and *désobéir* are followed by *à*.

45.11.—*Si son fils revenait! . . . Supposons qu'il revienne en effet*. Suppose his son returned! Let us suppose he has really returned. *Supposer* is followed by the subjunctive, as it denotes only a conception of the mind, and not an actual fact.

45.14.—*jusqu'au fond de la Sibérie*, right into the heart of Siberia.

45.18.—*ni toit ni foyer*, neither hearth nor home. *Toit* from Lat. *tectum*, roof.

45.18.—*Il s'informe*, he inquires.

45.19.—*profité de*, profited by.

45.21.—*après l'avoir amené*, after leading him. *Après* is always followed by a compound gerundial infinitive.

45.21.—*on a payé ses bienfaits*, the benefits he conferred have been requited.

45.23.—*Ce ne sont toujours que des suppositions*. These are still only suppositions.

45.27.—*Eux, que répondraient-ils?* what would *they* answer?

45.29.—*Ce qu'ils répondraient?* what would they answer?

45.31.—*laissons là toute feinte*, have done with all pretence (lit. let us leave there all pretence). *Feinte* from Lat. *ficta*, pretended.

45.36.—*aïeux*, ancestors. But *aïeuls*, grandfathers.

46.1.—*seuil*, noun masc. sing., threshold. Lat. *solium*.

46.3.—*Je ne vous en dirai pas davantage*, I will say to you no more (than he said). *More* is translated by *davantage*, when it ends a sentence.

46.5.—*Croyez-vous me l'apprendre?* Do you think you are informing me of a fact?

46.11.—*dont moi je crois être en mesure de contester la valeur*, the validity of which I believe I am in a position to contest.

46.15.—*Je ne sais qu'un arrangement possible entre nous*, I know only one arrangement between us which is possible.

46.17.—*Il n'est pas*, there is not.

46.18.—*Il ne convient pas*, it is not fitting.

46.25.—*qui se fût abandonné*, who would have abandoned himself. Especially in elevated style, the imperf. subj. of *être* and *avoir* may be used as a conditional.

SCENE 7.

47.8.—*que j'ai rencontré*, whom I have happened to meet. *Rencontrer* signifies a casual accidental meeting. The reader will be able to decide for himself how far the meeting of Destournelles with two hundred villagers was casual.

47.8.—*à qui je n'ai pu taire*, from whom I have not been able to hide. The preposition *à* here represents the Latin *ab* (from), while in the sense of *direction* to or *rest in* a place it represents the Lat. *ad* (to). *Taire* from Lat. *tacere*, keep silent.

47.11.—*vous vous êtes permis . . .* You have allowed yourself . . . . *or better still*, you have taken the liberty . . .

47.12.—*une surprise, un enthousiasme universel*, universal surprise and enthusiasm. An abstract noun accompanied by an adjective requires *un* or *une* in French.

47.14.—*à grands cris*, with loud shouts.

47.19.—*il jouira d'un spectacle*, he will enjoy a sight. *Jouir* is followed by *de*.

47.20.—*se disputant les mains* (lit. disputing to each other the hands); struggling with each other to grasp the hands.

47.27.—*de m'attendre*, from expecting.

48.4.—*Ce sont mes amis*, they are my friends. See note on 39.14.

48.8.—*une ovation aussi populaire*, so popular an ovation.

SCENE 8.

48.14.—*quant à son client . . .* as for his client.

48.18.—*je n'y pourrai rien*, I shall be powerless in the matter.

48.21.—*va-nu-pieds* (lit. go-naked-feet), ragamuffin. *Nu* has the same peculiarity as *demi*, being invariable when preceding its noun, and agreeing with it when it follows it.

48.25.—*fils de bouvier*, cowherd's son.

49.2.—*S'imaginent-ils donc?* Do they think then?

49.4.—*haubert*, masc., hauberk, coat of mail; *sarrau*, masc., smock-frock.

49.5.—*Il peut rentrer d'un instant à l'autre*, he may come in again at any moment. *Il* refers to Bernard. The Baroness is advising the Marquis to take care his remarks are not overheard.

49.8.—*Monsieur de Buonaparte*, Napoleon I. Observe the Marquis does not give him the title of Emperor. The Royalists always spelt his name *Buonaparte*, a name of strictly Italian formation, in order to suggest that he was not French by birth.

49.9.—*Il se trouve qu'en fin de compte, les morts se ramassaient eux-mêmes, et les tués ne s'en portent que mieux.* The case is that after all was over the dead picked themselves up again, and those killed were only the better for it (*that is*, for being killed). The reference is to the re-appearance of Bernard, who was believed dead.

49.12.—*pour ne plus se relever*, never to rise again.

49.13.—*à la bonne heure*, well and good.

49.14.—*ne fût on qu'un Stamply*, were one only a Stamply.

49.15.—*c'est le moins qu'on ne vienne pas soi-même le raconter aux gens*, the least one can do is not to come and tell the tale oneself to folks.

Gens requires all adjectives following it to be in the masculine, and those preceding it to be in the feminine. The masculine is used before it when *tout* alone precedes it, or when *tout* is accompanied by an adjective having the same form for both genders.

49.17.—*pour deux sous de cœur*, a pennyworth of courage.

49.18.—*tête baissée*, head foremost.

49.20.—*ça ne sait pas vivre.* *Ça* (contraction for *cela*) is used contemptuously for *il*. Translate 'he is not well-bred.' *Savoir vivre* is to know the usages of good society.

49.23.—*Que ne restait-il en Sibérie?* Why did he not stop in Siberia? *Que* is 'why?' when used to express irritation, and not demanding an answer. In this sense, *ne* only is required after it to express a negation.

49.23.—*il y avait ses habitudes* (lit. he had his habits there), he was accustomed to the life there. *y* = 'there' in this case. *Il y avait* is not here a form of *il y a*, there is.

49.31.—*de tribunaux en tribunaux*, from one court to another.

50.1.—*tant que Bernard sera*, as long as Bernard is. The future *sera* is used in French, because futurity is implied.

50.9.—*cette lettre de tantôt* (lit. that lettre of a little while ago), the letter I mentioned a short time ago. See Act I., Scene 5.

50.20.—*à se rendre auprès du ministre*, in betaking himself to the presence of the minister.

50.23.—*les siens propres*, his own. *Les siens* by itself would be rather ambiguous, as two persons are mentioned in the sentence, to each of whom it might refer. *Propres* is from Lat. *proprius*, one's own.

50.27.—*qu'il ne nous en faudra*, than we shall need (lit. than it will be necessary to us of it, *i.e.* of time). *Ne*, which is not translated, is used because the sentence depends on a comparative expression, *plus de temps*. The *ne* is omitted if the comparative on which the sentence depends occurs in a negative or interrogative sentence.

50.28.—*avoir raison de*, get the better of. But *avoir raison* without *de* = to be right.

SCENE 9.

50.31.—*sans Monsieur Destournelles*, had it not been for Monsieur Destournelles.

51.1.—*je ne m'en défends pas*, I will not deny it.

51.7.—*en maître*, as master. See note on 35.7.

51.10.—*vous n'avez à redouter de ma part rien de blessant pour votre dignité*, you have not to fear from me anything which may wound your dignity.

51.11.—*qui soit au-dessous de la mienne*, which is beneath my own (dignity). The subjunctive is used when *qui* introduces a sentence which does not state a fact, but which is merely descriptive.

51.21.—*est-ce ainsi?* . . . is it thus? . . . ('that you leave us' is understood). The Baroness is anxious that he should not leave in a hostile spirit. Bernard, however, takes her remarks to be a reminder to him that he has forgotten her presence. He repairs the omission, by taking a ceremonious leave of her.

SCENE 10.

51.25.—*serait-ce possible?* is it possible? The conditional is used to express hesitancy and surprise.

52.8.—*j'aurais dû vous reconnaître*, I ought to have recognised you? Our verb *ought* is defective, whereas the French *devoir* is fully conjugated.

52.9.—*toute tremblante*, all of a tremble. *Tout*, even when used as an adverb, takes the sign of the feminine when it precedes a feminine adjective commencing with a consonant or aspirated *h*.

52.11.—*de vos vieux amis*, one of your old friends.

52.22.—*j'y songe* (lit. I think of it), I am forgetting.

52.34.—*Ce parquet lui brûle les pieds*, this floor burns his feet. Lit. 'this floor burns to him the feet.' For the use of the article instead of the possessive pronoun before names of parts of the body, see also 53.9.

53.4.—*nous ne pouvons que vous rendre d'une main*, we can only return to you with one hand.

53.9.—*se couper le poignet* (lit. to cut to himself the wrist); to cut his wrist off.

53.17.—*C'est donc une perspective si effrayante que celle de se sentir aimé?* Is the prospect of feeling that one is loved so terrible a one? The explanatory phrase *celle de se sentir aimé* is connected with the sentence containing the word *perspective*, which it explains, by *que*, which is in this use untranslatable into English.

53.19.—*se plaisait*, took a delight.

53.23.—*Il est à nous*, he is ours; we have won him.

53.31.—*qu'il parte ou qu'il reste*, whether he goes away or stays.

54.2.—*d'un petit vin*, in a light wine.

54.11.—*à propos*, in the nick of time.

54.12.—*Pour que*, in order that. This conjunction governs the subjunctive.

54.17.—*Laissez-la faire*, let her alone; let her have her own way.

54.27.—*Barthole, Cujas*, were famous lawyers, whose names he applies, in his bantering way, to *Destournelles*, as in Act I., Scene 6, he applies to him the names of *Fronsac* and *Lauzun*.

54.30.—*Je prétends vous griser*, I intend to make you drunk. *Gris* is properly *grey*. By a metaphorical use it came to mean 'intoxicated.'

55.4.—*vous le remettrez*, you will hand it over.

55.6.—*vient de l'apporter*, has brought it.

ACT III., SCENE 1.

56.4.—*Je pourrai vous en montrer beaucoup d'autres*, I shall be able to show you many others of the same kind.

56.6.—*C'est un beau pays que la Bavière*, Bavaria is a beautiful country. The *que* here is redundant. Compare note on 53.17.

57.2.—*de mon avis*, of my opinion.

57.5.—*ce que dit la Quotidienne*, what the *Quotidienne* (a newspaper) says. When a sentence commences with *ce que* the subject may be placed after the predicate.

57.8.—*la manie des places*, place-hunting.

57.12.—*Il en était de même sous Monsieur de Maurepas*, it was just the same under Monsieur de Maurepas. *M. de Maurepas* was one of the finance ministers under Louis XVI. See Carlyle's 'French Revolution' for a lively sketch of him. Very characteristically, the Marquis goes back to the time of the old *régime* for an illustration.

57.15.—*se fait remarquer depuis six semaines*, has for the last six weeks brought himself into notice.

57.22.—*à la veille*, on the eve. *Veille*, from Lat. *vigilia*, watch; eve.

57.24.—*Il y a si longtemps qu'il la demande.* He has been asking for it so long. The present tense is used here because Destournelles was still asking for the place.

57.34.—*Monsieur le Commandant.* The Baroness gives Bernard the military title he held in the army of the Corsican usurper, and the Marquis makes no remark. This was in pursuance of their plan to propitiate him.

58.10.—*Que de peine*, how much trouble. *Que* is used instead of *combien* when 'how much' is used as an exclamation.

58.11.—*vous partiez, s'il ne me fût venu à la pensée*, you would have gone away, if the idea had not occurred to me.

58.17.—*bien des préventions*, many prejudices. *Bien*, as an adverb of quantity, takes *des*, not *de*, after it.
Prévention, fem., prejudice; *préjudice*, masc., damage.

58.20.—*ce n'est pas répondre*, that is no answer.

59.1.—*J'ai été aux informations*, I have made inquiries.

59.2.—*mestre de camp*, colonel of a regiment. *Mestre* is lit. 'master' (German, Meister).

59.4.—*le Chevalier d'Assas*, who, during the Seven Years' War, was surrounded by a body of the enemy, and threatened with death if he should utter a sound. He undauntedly called to his comrades, and sacrificed his life to secure the safety of the French Army. The Marquis has brought himself to admit that the Revolutionary soldiers possessed a little courage and ability.

59.12.—*Laissons là la politique*, let us leave politics alone.
Politique, fem., politics; *politique*, masc., a politician.

59.20.—*tringuer*, vb. inf., to chink glasses when drinking together. German *trinken*, to drink.

59.25.—*le Marquis en fait autant*, the Marquis does the same (*i.e.* sits down).

59.27.—*Est-ce bien là le cours de la rivière?* Is the course of the river there?

59.36.—*Qu'est ce que c'est que ça?* What is that? What name is that? The Marquis's ignorance of the names of the great generals of the Revolution and the Empire is probably only assumed. It is his manner of expressing his contempt for them.

TEACHERS' DRAWING LESSONS.

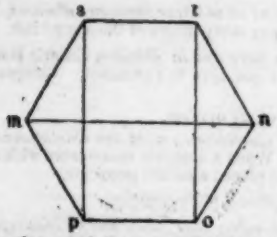
MODEL.

STANDARD VI.

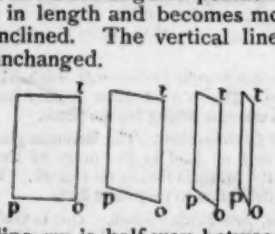
BY E. BUFFERY RIDGE,
Art Master under the London School Board.

Hexagonal Prism, lying on one side.

REFER to Fig. 2, and look at the relation between *op* and *ot*. The horizontal line is a little greater than half the vertical line. Draw on one end of the prism, the lines shown in the sketch, marking the centre. The proper relation between *op* and *ot* is the only *difficult* point in this model.



Draw the upright rectangle *opst*. Seen full in front *op* is rather more than half *ot*. A slightly angular view would reduce *op* to about half *ot*, and as the model is seen in a more and more angular position *op* decreases in length and becomes more and more inclined. The vertical line *ot* remains unchanged.



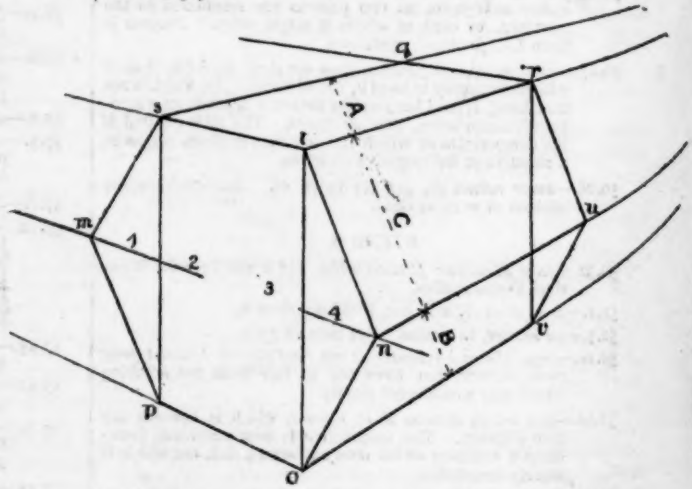
The line *mn* is half-way between *op* and *st*.

Place it in position by bisecting *op* and *st* and drawing *mn* any length through the marks. As the two former lines vanish, *mn* will vanish with them. To fix the position of *m* and *n* it must be remembered that *mn* is divided into four equal parts, and that although the effect of distance may make the nearer parts appear larger than the more remote, yet the two extremes will always be together equal to the two middles.

By marking *n* at a distance a little greater, and *m* a little less than one of the middle parts, the remaining corners are fixed, and the hexagon may be completed.

This is one end of the solid only, and equal care must be used in drawing the other end. Observe the slope of one of the long edges, the second from the top is the best for the purpose, draw the line *tr*, fixing the length by comparison with *ot*. Draw the other three long edges to vanish with *tr*. Vanishing to the left with *op*, *nm*, and *ts* draw *nq*. A perpendicular from *r* gives *v* (neglect of this point spoils many otherwise good drawings), and *u* is placed to make the triangle *ruv* similar to the triangle *tno*. Notice if the line *uv* so obtained vanishes with *no*. The lines *tn* and *ru* will be parallel when the faces A and B are equal, and vanishing slightly towards the narrower sides in other cases. See if the width of C is equal to, or greater than the widths of A and B together. A common mistake is to get the middle width C too small. In every class some children will at first draw the line *nu* from the centre of the upright line *ot*.

This solid should be drawn several times, with the nearer end to the right as well as to the left, and arranged so that pupils who get a narrow view of the end at one time should get a broad view at another time. It should be thoroughly well studied and *learnt*. It is used by Inspectors oftener than any other figure. (In the diagram, Fig. 8, the 'vanishing' is exaggerated in order to make it show unmistakeably.)



Cone standing, Hexagonal Prism leaning against it.

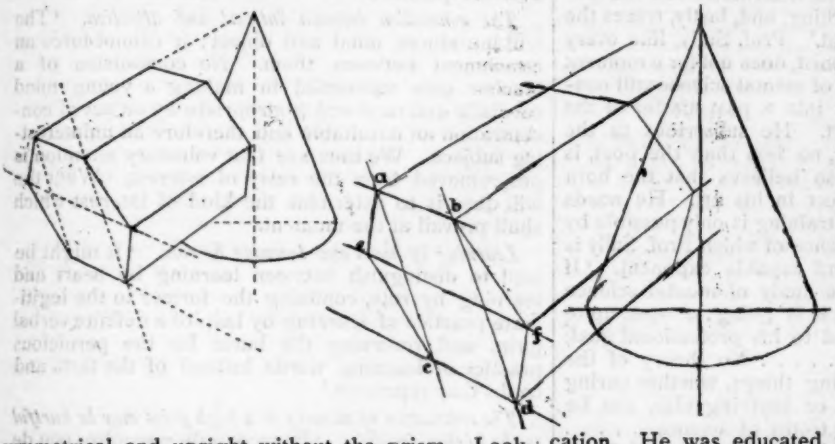
Draw this group by the method of parallels, prism first.

The figure on the left represents the model, that

on the right the drawing. Draw by parallels the parallelogram *abcd*, and apply knowledge of previous lessons to obtain *e* and *f*. Finish the prism by parallels. Fix the position of the apex and the base of the cone, and draw the sides parallel to sides of the model.

Sketch the whole of the cone.

Note if the prism hides the right proportion of the cone in the drawing, and if the cone would be



symmetrical and upright without the prism. Look at the prism when held upright.

Hexagonal Pyramid, lying on one side on a board.

Draw by parallels as in previous lesson. Take care when the drawing is sketched to turn the paper so as to place the pyramid *upright*, and see that it is not *lop-sided*.

MODERN EDUCATIONAL REFORMERS.

BY THOMAS CARTWRIGHT, B.A., B.SC. (LOND.),
Author of 'Mental Science and Logic for Teachers.' Late Director of the Birkbeck Training Classes and Lecturer therein on School Method.

No. XIII.—PROF. JAS. SULLY, M.A.,

The Author of the 'Teacher's Handbook of Psychology.'

WITHIN the scope of these articles come all the good men and true who, during the last few decades, have either within or without the walls of the schoolroom forged a link in the chain of educational progress and reform. We teachers (small blame to us) are prone to look askance at the mere theorist. Nor need it be feared that this suspicious habit is likely to die out; rather is it to be feared that this predilection may be a stone of stumbling in so far as it prevents us from paying sufficient attention to the gospel according to the theorist. This danger is all the more real because, in the first place, some of the most potent reformers in the educational field, as for example Montaigne, Locke, and Spencer, have never been schoolmasters, whilst many others have simply had the experience that comes from the exercise of professoral or tutorial functions, and because, in the second place, the theory side of education has been totally neglected in the training of the English teacher. In Germany and America—the two countries in which pedagogics flourishes most conspicuously—it would not be difficult to name a dozen works wherein is intelligently traced out the necessary connection between teaching methods and teaching principles on the one hand, and the laws of mind on the other. In England such books could not live. There is no demand for them, say the publishers, and the publishers are right. First among modern English philosophers of eminence to remove, in some measure, this reproach was Prof. Bain, whose 'Education as a Science' will always hold an honoured place in the history of the development of educational theory. Following in his wake comes the writer whom we propose to sketch to-day, whose claim as an educational reformer is of the clearest description.

James Sully was born at Bridgwater, in Somerset, in 1842. He is, therefore, now in his prime, and much may be confidently expected from him yet in contribution to the Science of Education. He was educated, in the first place, at the Independent College, Taunton—the *alma mater* of many worthy British citizens. He then attended the Regent's Park College, and, finally, passed to the University of Göttingen in Germany. His bias in the direction of philosophy soon became evident, and in 1868 he won that coveted distinction—the Gold Medal for Mental and Moral Science—at the examination for the Degree of Master of Arts.

He became a journalist, writing on philosophic and economic subjects for several periodicals. He then undertook the post of Lecturer on the Theory of Education in the College of Preceptors, the deliverance of which has firmly established Mr. Sully's claim to consideration as an eminent worker in the cause of education. He became Examiner for the Teachers' Training Syndicate, Cambridge, and Examiner for the Teachers' Diploma of the London University. He has also been Examiner to the Universities of London, Cambridge, and Victoria in Mental and Moral Science. Quite recently he was chosen to succeed the late Prof. Geo. Croom-Robertson as Grote Professor of Logic and Mind at University College, Gower Street.

It was in 1884 that Mr. Sully published his 'Outlines of Psychology,' a book which was destined to replace all other elementary works on the same subject by virtue of its clearness no less than for the wealth of reference contained therein. It is not, however, on this account that we quote the book here. We are concerned with the fact that in this systematic treatise on psychology we have, for the first time in England, a book that shows the bearing of mental science, in all its divisions, upon teaching methods. We will let the Professor speak for himself in this connection:—'I have added special sections in a separate type dealing with the bearing of the science on education. . . . . I trust that these portions of my volume may serve to establish the proposition that mental science is capable of supply-

ing those truths which are needed for an intelligent and reflective carrying out of educational work. I may perhaps assume that modern pedagogics has adopted the idea that *education is concerned not simply with instruction or communicating knowledge, but with the training of faculty.* And it seems a necessary corollary from this enlarged view of education that it should directly connect itself with the science that examines into the faculties, determines the manner and condition of their working, and, lastly, traces the order of their development.' Prof. Sully, like every other enlightened educationist, does not for a moment pretend that a knowledge of mental science will convert an incapable teacher into a past master of the art. Nothing of the sort. He subscribes to the doctrine that the teacher, no less than the poet, is born, not made. He also believes that the born teacher is not born perfect in his art. He needs training, and enlightened training is only possible by the illumination of the science of which Prof. Sully is such an ardent disciple and capable exponent. 'If a teacher approaches the study of mental science with the supposition that it is going to open up to him a short and easy road to his professional goal, he will be disappointed. . . . . No theory of the processes involved in doing things, whether curing bodies, educating minds, or anything else, can be built up wholly out of the truths of science. . . . . *The best method of bandaging a limb, and the best way to teach Latin, are largely matters to be determined by experience.*' A more temperate claim on behalf of the science of mind in its relation to education cannot well be imagined. The 'Outlines of Psychology' was a pronounced success, a fact that encouraged Prof. Sully to identify himself even more closely with the attempt to apply psychology to education. Accordingly, in April 1886, was issued 'The Teacher's Handbook of Psychology,' wherein 'By considerably reducing and simplifying the statement of scientific principles, and expanding the practical applications to the art of education, he hopes he may have succeeded in satisfying an increasingly felt want among teachers, viz., of an exposition of the elements of Mental Science in their bearing on the work of training and developing the minds of the young.'

Let nobody think that the book is of the genus 'dry-as-dust.' On the contrary, it is profoundly interesting, and the style is so easy and popular that the veriest tyro would be able to read and to digest it. Furthermore, one meets with apt quotations and Kernal says at every turn, as we will now set ourselves to prove.

What mental science can do for the teacher. (1) An accurate acquaintance with the mental faculties, which are the material that the educator has to work upon and mould into shape, will supply him with a criterion or touchstone by which he may test the soundness of existing rules and practices in education. (2) The knowledge so gained may be made to directly suggest better educational rules than those in vogue.

Different ways in which the growth of knowledge may be viewed. (1) It is a gradual progress *from vague to distinct* knowledge. The perceptions and ideas grow more definite. This may be called intellectual *differentiation.* (2) It is a progress *from simple to complex processes.* There is a continual grouping or *integration* of elements into organic compounds. (3) It is a continual movement *from external sense to internal thought or reflection.* Or, as it is commonly described, it is a transition from the *presentative,* or what is directly presented to the mind through sense, to the *representative,* that which is indirectly set before the mind by the aid of internal ideas. (4) It is a transition *from the knowledge of individuals to that of general classes,* or from a knowledge of concrete things to that of their abstract qualities.

The connection between interest and attention. 'The will introduces mind and object; it cannot force an attachment between them. No compulsion of a teacher ever succeeded in making a young mind cordially embrace and appropriate by an act of concentration an unsuitable and therefore an uninteresting subject. We thus see that voluntary attention is not removed from the sway of interest. What the will does is to determine the kind of interest which shall prevail at the moment.'

Learning by heart and learning by rote. 'It might be well to distinguish between learning by heart and learning by rote, confining the former to the legitimate practice of learning by help of a definite verbal form, and reserving the latter for the pernicious practice of learning words instead of the facts and truths they represent.'

The cultivation of memory to a high point may be hurtful to the higher faculties. 'Beaucoup de memoire, peu de jugement.'

> 'Thus in the soul while memory prevails,
> The solid power of understanding fails.'
> (*Quoted from Pope.*)

Risks of uncontrolled imagination. 'A youth whose mind dwells long on the wonders of romance may grow discontented with his actual surroundings, and so morally unfit for the work and duties of life. Or what comes to much the same, he learns to satisfy himself with these imaginative indulgences, and so by the habitual severance of feeling from will he becomes incapable of deciding and acting.' On the other hand, 'Educators have been wont, perhaps, to over-estimate the evils of children's flights of fancy. The imaginative creation of a glorious realm of fairy-land is natural and appropriate to children. It is the source of much pure delight.'

Children's books, why they fail to interest. 'It is not needful to speak of the "nightmare" and strongly sensational stories, which injure children's minds by disposing them to dwell in a morbid way on images of the terrible, and vitiate the taste by begetting a craving for sensational excitement. . . . Nor need one refer to the potently didactic and "goody" stories which commonly weary children—when they succeed in engaging any measure of attention at all. It is more important to call attention to a besetting fault in recent children's literature, viz., that of describing experiences, situations, impressions and feelings quite out of their mental reach. The writers of children's books but too rarely have the art of looking at the world with the eyes of a young person. . . . . This vice of writing over children's heads is a serious drawback to the educational value of the writing.'

On the inductive method in teaching. In some cases, as in teaching the rules of grammar, it may be desirable to proceed according to an inductive method, *i.e.,* leading the pupil up from an inspection of words

in actual use to a comprehension of the laws that govern their use. *And in no cases ought principles to be taught before some examples are given.* . . . . The words of Seneca in reference to practical training apply to theoretic instruction also:

'Longum iter est per præcepta!
Breve et efficam per exemple.'

On fear. 'Every governor has to work to some extent on the fear of the governed, and the teacher is no exception. Here, however, he must be careful not to excite the emotion in its unnerving and prostrating intensity. The policy of compelling by threat, if carried out to its cruel extremity, must necessarily defeat its own end. By exciting terror in children, we deprive them of the power of doing the very things which we require. Where, however, the evil is definite in character, and of dimensions which can be grasped by the pupil's mind, the agitation of terror is eliminated and the will is spurred to activity by a calm apprehension of a realisable amount of suffering.'

On passive submission. 'A child that is tame and spiritless, and allows the bully to indulge his love of power to the utmost, proves himself to be unfitted to take his part in the battle of life. And such servile submission, so far from being praised by the moral educator, should, if needful, be denounced.'

On rivalry. Rivalry is a feeling to be kept in the background. Children should be encouraged to excel rather for the sake of the attainment itself than for that of taking down another. In other words, the scholar's prevailing motive should be worthy ambition, or desire to get on, rather than the distinctly anti-social impulse of rivalry.' As Rousseau and others have pointed out, the teacher can further this result by his mode of apportioning praise, *grounding his estimate on a comparison between what the pupil has been and what he is, and not between what he is and somebody else is.*'

On sympathy. 'As Jean Paul Richter observes, in order to feel with another's pain it is enough to be a man; to feel with another's pleasure, it is needful to be an angel.'

On gratitude. 'Gratitude is one of the most certain, but one of the latest rewards which preceptors and parents should expect from their pupils' (quoted from Miss Edgeworth).

On rules. Since the learning of obedience to any rule is a matter of time, it is of the greatest consequence not to lay down too many at once. 'I have seen,' says Locke, 'parents so heap rules on their children, that it was impossible for the poor little ones to remember a tenth part of them, much less to observe them.' Again, 'In order that a rule may be operative, it must (*a*) refer to an action that the child may be reasonably expected to be able to perform, (*b*) it must be intelligible, and (*c*) it must be uniformly enforced.'

Having, even to the verge of prolixity, given our readers a taste of the mettle of our reformer, we hasten, for the nonce, to take our leave of both reformer and reader, merely staying to commend reader to reformer and *vice versâ*, with as much heartiness as we may command.

NEW COMPOSITION STORIES.—STANDARD V.

Suitable for 'Unseen Tests' in Reading also.

200.

LEARNING TO SWIM.—Two twin brothers, aged four, after having their morning wash, and each getting a clean pinafore put on by their mother, were allowed to go out and amuse themselves for a little while. About an hour afterwards, as the children had not come in again, the mother went out to look for them. Going round to the back of the house a short distance, she soon discovered the two young gentlemen lying flat on their faces in a little rivulet half full of water and mud. She immediately demanded what they were doing there, and one of the boys, for answer, exclaimed, 'We're learning to swim, mother.'

201.

HER TREASURE.—A little girl of seven, who looked even younger, stood in the hall of a big bank. Walking over to the counter she timidly said that she would like to be shown round the institution as soon as convenient. As she was a very attractive little maid, her request was at once complied with. It was a slack time of day, and the chief clerk escorted her round himself, showing her the workings of the big locks, and laughingly introducing her to all the gentlemen they met. When going out she thanked him, and said: 'You see, my papa has 'posited five shillings here for me, and I wanted to be sure it was in a safe place. Thank you!' And out she marched, radiant and satisfied.

202.

FOR DIFFERENT REASONS.—An Irishman, one morning, went out very early in search of some game on an estate where the game laws were strictly enforced. Turning the corner, whom did he meet but the gentleman who owned the estate. Paddy, seeing the game was up, coolly advanced toward the gentleman and said, 'The top of the morning to your honour! And what brought your honour out so early this morning?' The gentleman replied by saying, 'Indeed, Paddy, I just strolled out to see if I could find an appetite for my breakfast;' and then, eyeing Paddy rather suspiciously, said, 'And now, Paddy, what brought you out so early this morning?' Paddy replied, 'Indade, your honour, I just strolled out to see if I could find a breakfast for my appetite.'

203.

ON THE UNDERGROUND RAILWAY.—A train was just starting in an Underground station, and a gentleman was about to open the door of a carriage and jump in, when the guard ran up, seized him, and, pulling him back, said: 'I've probably saved your life, sir. It's most dangerous to get on a train when in motion.' Presently the guard's van came along, and the guard was just gliding in, in that graceful manner peculiar to Underground Railway servants, when the aforementioned gentleman rushed up, and pulled him back by the coat-tails, crying, 'You saved my life; I must save yours.' Imagine the guard's disgust as the train went off without him.

204.

PATHOS AND HUMOUR.—It was a bitterly cold night—indeed, it was Christmas Eve. Without the snow was falling heavily, and covering houses, trees, and landscape as with a glittering pall of white. A woman and two children were trying to sleep in a room destitute of every comfort. Their only bed was a heap of straw, and they had no coverings. As a means of keeping off the draught, and confining their own natural warmth to a small area, the woman placed the straw in a corner of the room, and taking the door off its hinges, placed it against the wall in a slanting position. All three then crept under, huddled together, and the poor mother's trouble was well repaid when she heard one child say, 'Mother, what must those poor children do who have *no nice door to cover them!*'

205.

NEATLY PUT.—Two farmers who had quarrelled and who bore each other much ill feeling, chanced to meet in a quiet country lane. It was very muddy, and, to escape the slush on either side, both men were walking in a narrow rut made by the wheels of a wagon. Gradually they neared each other, but neither would move aside. When they came together, face to face, each glared savagely at the other. At last one of them, becoming impatient, exclaimed blusteringly, 'I never make way for a fool.' The other paused a moment, and then, stepping aside, said quietly, 'I do, sometimes.' His ready wit made him master of the situation, and his opponent walked off rapidly without a word.

206.

AN EXCEPTION TO THE RULE.—An officer and a Jew were travelling in the same compartment on the railway. After conversing for some time on the best of terms, the officer pulled out a packet of sandwiches and politely offered one to his companion. The latter, seeing that the meat was ham, courteously declined, adding that he was strictly orthodox, and would not break any article of his faith. The officer apologised, and shortly afterwards tendered the Jew a drink of wine from his flask. This the Jew also refused on the same grounds as before. 'I can scarcely believe,' said the officer, 'that such traditional usages could be so strong now-a-days. Supposing you were lying half-starved and dying of thirst in a wilderness, and you were offered drink in the same manner, would you still refuse it?' 'Oh no,' replied the Jew; 'when actual danger to life threatens, we may make an exception.' 'So!' cried the officer, drawing his sword and presenting the point at his companion's breast, 'if you don't drink this wine at once I'll run you through!' The Jew took the flask quietly and emptied it. Then with a sigh he said—'Why didn't you do that with the sandwiches?'

207.

THE MISERLY MERCHANT OUTWITTED.—In one of our large towns there lived a merchant who had never given a shilling away in his life. One day an Irishman stepped into his office, and told him that he had lost his pig—the only pig he had. Then he seated himself on a chair and wept bitterly. The merchant, moved to pity, dropped a sovereign into the poor fellow's hand, and the Irishman, after expressing his thanks, left the shop. Next day the merchant met his visitor in the street, and said to him, 'Paddy, if you buy another pig, you must take better care of it,' and then added, 'What did your pig die of?' 'Oh, of nothing particular, your honour,' said Pat; 'it was too fat, and I had to kill it.'

208.

CONFUSED.—A captain in the army had a rather queer servant as orderly. One morning he ordered him to bring him his boots. The orderly returned and said, 'Here they are, sir.' 'What is that pair you have brought? Why, one is a riding-boot, and the other a lace-up shoe!' said the officer. 'Yes, sir,' said the orderly, 'I was a bit surprised myself; and the worst of it is, there's another pair outside exactly like them!'

209.

A SHARP DOG.—A country gentleman had a wig which he did not often wear. It generally hung on a peg in one of his rooms. He lent this wig to a friend, and some time afterwards called upon him, taking his dog with him, and the man happened to have the borrowed wig upon his head. The gentleman stayed a little while with his friend and then left him, but the dog remained behind. For some time he stood looking full in the man's face, then, making a sudden spring, he leapt on his shoulders, almost frightening him out of his senses, seized the wig, and ran off with it as fast as he could. When he reached home, he tried by jumping to hang it up on its usual peg.

210.

SHE HAD FORGOTTEN HERSELF.—Some gentlemen of a Bible Association calling upon an old woman to see if she had a Bible, were severely reproved with the reply, 'Do you think, gentlemen, that I am a heathen, that you should ask me such a question?' Then addressing a little girl, she said, 'Run and fetch the Bible out of my drawer, that I may show it to the gentlemen.' They declined giving her the trouble, but she insisted upon giving them ocular demonstration. Accordingly the Bible was brought, nicely covered; and, on opening it, the old woman exclaimed, 'Well, how glad I am you have come; here are my spectacles that I have been looking for these three years, and didn't know where to find 'em.'

211.

TO CURE A HUSBAND.—A woman whom her husband used frequently to beat, went to a cunning man to inquire how she might cure him of his barbarity. The sagacious soothsayer heard her complaint, and, after pronouncing some hard words and using various gesticulations, while he filled a phial with a coloured liquid, desired her, whenever her husband was in a passion, to take a mouthful of the liquor and keep it in her mouth for five minutes. The woman, quite overjoyed at so simple a remedy, strictly followed the counsel given to her, and, by her silence, escaped the usual chastisement. The contents of the bottle being at last expended, she returned to the cunning man, and anxiously begged to have another possessed of the same virtue. 'Fool,' said the man, 'there was nothing in the bottle but brown sugar and water. When your husband is in a passion, hold your tongue, and my life for it, he will not lay a finger upon you.'

212.

COURAGE.—During the siege of Gibraltar, its governor, General Elliott, was one day making a tour of inspection, when he came upon a German soldier, who, though standing at his post, neither presented arms, nor even held his musket. 'Do you know me, sentinel?' enquired the general. 'Why do you neglect your duty?' 'I know you well, general, and my duty also,' was the reply; 'but within the last few minutes two of the fingers of my right hand have been shot off, and I am unable to hold my musket.' 'Why don't you go and have them bound up?' 'Because in Germany a man is forbidden to quit his post until he is relieved by another.' The general instantly dismounted. 'Now, my friend,' said he, 'give me your musket, and I will relieve you. Go and have your wounds dressed.' The soldier obeyed, but went first to the nearest guard-house, where he reported that the general was standing on duty in his place. His injury unfitted him for active service, but the story of his courage soon reached England, and he was made an officer.

213.

CURING THE MEASLES.—A lady had two children sick with the measles. She wrote to a trusty friend for advice. This friend at the time she got the letter was writing to a newly-married sister, telling her how to make pickles. As she finished the replies to the two inquiries, she placed the letters on one side till she had addressed the envelopes. Then she placed a letter in each, and posted them immediately. The next morning the anxious mother of the sick children opened her letter and read with horror, "Take them and scald them three times in hot vinegar, sprinkle them with salt, and in a few days they will be right.' When all was explained, it turned out that the letters had, by mistake, been put into the wrong envelopes. The lady who had asked about pickles got the safe cure for measles, and *vice versâ*.

214.

A MISTAKE.—Two sailors, one Irish and the other English, agreed reciprocally to take care of each other, in case of either being wounded in an action about to commence. It was not long before the Englishman's leg was shot off by a cannon ball; and on his calling to Paddy to carry him to the doctor, according to the agreement, the other very readily complied; but he had scarcely got his wounded companion on his back when a second ball struck off the poor fellow's head. Paddy, who, through the noise and disturbance common in a sea engagement, had not perceived his friend's last misfortune, continued to make the best of his way to the surgeon. An officer observing him with a headless trunk upon his shoulders, asked where he was going. 'To the doctor,' says Paddy. 'The doctor?' says the officer; 'why, you blockhead, the man has lost his head!' On hearing this, he flung the body from his shoulders, and looking at it very attentively, 'Why,' says he, 'he told me it was his leg!'

NEW READING TESTS.—STANDARD III.

Suitable for 'Unseen Tests' in Dictation also.

166.—In winter time one of our most familiar out-door friends is the robin red-breast, a hardy little fellow who so long as he can procure his daily bread, does not mind cold weather. The swallow, on the other hand, is a more delicate bird, and as a rule is seen in northern countries in summer only, for on the approach of winter he migrates to warmer lands.

167.—The fur of the mole is arranged in such a manner as not to impede its progress while passing either backwards or forwards along its burrow. In order to attain this result, each hair is finest nearest the body, gradually increasing in thickness towards the tip, and is set perfectly upright so as not to impede the animal in its movements.

168.—Some years ago a traveller stayed at an inn, where, after supper, the landlord put down a great dish of food and rang a bell, when in came a huge dog, a cat, a rat with a bell round its neck, and a raven. These all ate together and were most friendly. The landlord said that the rat was the most

useful, for the noise of the bell as it ran about frightened other rats and mice, and the house was quite clear of them.

169.—An old woman walked into a bank the other day, threw down her deposit book, and said she wished to withdraw all her money. Having got it, she retired to a corner of the room and counted it. She then marched up to the clerk and exclaimed, 'That will do, my man; put it back again. I only wanted to see if it was all right.'

170.—A dog with a piece of meat in his mouth was crossing a bridge. Looking down into the water he saw (as he thought) another dog with a piece of meat. This he could not forbear snatching at. But in his efforts to obtain it, he lost what he had, which fell to the bottom and was lost. The person who snatches at more than belongs to him deserves to lose what he has.

171.—Jennie, when she was about three years old, went one day into the kitchen when the cook was busy skinning a hare. The child watched her with the gravest interest without saying a word; but at the end of the operation heaved a deep sigh, and said, 'Can you put his frock on again, cook?'

172.—A single tiger has been known to destroy annually between sixty and seventy head of cattle, none costing less than five pounds, and many being worth double the money. When they have killed an ox they drag it to their feeding place, and then open and clean the body as neatly as any butcher could do, always putting the offal at some distance from the meat.

173.—Buffaloes are the Indian's best friends. Their flesh furnishes the red man's larder; their wool is manufactured into a warm, coarse cloth; their hides are made into targets and tents; their horns are used as powder flasks, and their fat supplies tallow. Should the animals withdraw from a district, the natives must follow them or starve.

174.—On their road through the village the squire's children with the mail cart caused quite an excitement, as it was the first of the kind that had been seen in this out-of-the-way corner of Old England. As for the village children, they just stood and stared, with their mouths so wide open that it was a wonder they were ever able to shut them again.—(H.M.I.'s Test.)

175. Swinging on a leafy bough,
Little birdie sings,
Feels the summer sunshine now
On his tiny wings.
All the long bright summer day,
Little birdie trills his lay.
Singing sweet, and swinging high,
Underneath the summer sky.

NEW DICTATION TESTS.—STANDARD IV.

Suitable for 'Unseen Tests' in Reading also.

No. 110.

The *Royal George* foundered on the 26th August 1782. The bottom of the ship was foul, and, in order to save the time it would take to dock her for the purpose of cleaning it, it was determined to heel her over. For this purpose the guns were all placed on one side of the ship, to bring her as near as possible on her beam ends; but the weight proved to be too great, and she capsized and sank. As she was about to start on her voyage, the entire crew was on board, with a large number of women and children, and consequently there was fearful loss of life.

No. 111.

The blue colour of the sky is probably merely the colour of the air, seen through a length of about forty-five miles. It has been observed by those who have ascended about five miles above the earth's surface that the sky appears of a dark, inky hue, owing to the very small reflection and dispersion of the light, while the blue colour no longer appears above, but below them. Similarly, the blue colour of distant hills is owing to the same cause.

No. 112.

In Finland there is found a green stone. It foretells the weather, and its power to do so is all owing to its singular formation. In clear weather it is white and speckled; as rainy weather comes on, it turns black. It proves to be composed of clay, nitre, and salt. The salt absorbs the moisture and turns the stone dark; the salt then dries, as the weather clears off, and this leaves the surface full of white spots.

No. 113.

The experiment of serving a complete dinner was recently made on board one of the new saloon trains introduced by the London and North-Western Railway Company, and was attended with entire success. Two cooks and four waiters accompanied the party, and whilst the train was rushing along at about a mile a minute, dinner was served, and was partaken of without the slightest inconvenience. A large order has been issued for the construction of similar saloons of the same class.

No. 114.

One of the most unpleasant of plants is the 'burning tree' of India; both leaves and stems of this plant are covered with stinging hairs, after the manner of our own nettle. When touched, the sensation felt is as of being burnt with redhot iron, the pain extending over other parts of the body, and lasting for a fortnight. Little or no mark is to be seen on the skin, but, for some time after, should cold water touch the part, the pain returns with all its original intensity.

No. 115.

The things that constitute the true charm of a home cannot be bought or secured by the labour of hirelings. It is only the mistress of the house, the wife and mother, through her love and union of interest with her husband and children, who, guided by her affection, will labour to bring that charm about her household which springs from systematic labour, scrupulous neatness and economy, a nicely appointed table, with food daintily prepared, and served with taste.

No. 116.

A Russian nobleman who has experienced many of the hardships of which he writes, in describing the life of exiles in Siberia, says that its cruelty is so horrible that every spring, when the snow has disappeared from the forests, and men may sleep in the woods at night without being frozen to death, thousands of the convicts try to escape from the gold and salt mines. These poor folk prefer to run the risk of capture, and the brutal punishment it involves, rather than remain longer in endless misery.

No. 117.

Kid gloves in Russia are made from foal skins. These gloves, when properly dressed, are extremely durable, and at the same time soft and delicate, taking admirably every kind of dye. It is doubtful whether they could be profitably manufactured in other European countries, as the preparation of the skin requires an unusual amount of hand labour. In Russia, with its pauper peasantry, of course this is a matter of no importance.

No. 118.

The late captain of a cycling club had a singular funeral the other day. In accordance with his own wish, the coffin was conveyed to the cemetery on bicycles, four machines being braced together, and a platform constructed on which the coffin rested, the whole being draped in black, and covered with wreaths. This bicycle-bier was guided to the cemetery by members of the club, some twenty or thirty other members being also present.—(H.M.I.'s Test.)

No. 119.

To rank and station some are born,
And some must labour still,
But each within his own degree
His duty must fulfil;
Equality will come at last,
To all the self-same end;
Then let us for each other live,
And never lose a friend.

STANDARDS V.—VII.

No. 99.

MANY persons have a dangerous practice of allowing the gas to burn dimly all night long while they are asleep. If the gas is to be burning at all, it should, for safety's sake, be left blazing fairly high; for when the flame is reduced to the faint blue spark, the least diminution in pressure at the works will cause this to go out, and when the pressure is renewed, the gas, of course, escapes steadily into the room, to the possible injury of all its inmates. A night lamp should be used, if light is necessary, or a fair blaze so shaded as not to fall upon the faces of the sleepers. A whole family were nearly killed recently through keeping a live light too low to survive the lapse of pressure soon after midnight.

No. 100.

AN automatic 'fare-collecting box' for omnibuses and tramway cars has been invented. The passenger puts his penny into a slot, and receives in exchange a ticket, which is a receipt for his fare. The ticket is intended also to be an accident insurance policy for the journey, the amount insured being £100. It is considered that the public must have some return for the trouble of having to press their pennies into the slot, and the insurance is the return. If the box came into general use it would doubtless be a decided check upon the misappropriation of fares.

No. 101.

THERE are many pleasures which a blind person can enjoy in a peculiar manner. His sense of hearing is keener, and he feels sensations as persons with full sight never can feel them. This peculiar sensation is like none of the other senses; it may be called, very properly, the blind man's sense. This is what gives him such keen pleasure in music. He can hear sounds from a piano or violin which not even the performer is able to detect. He can hear sounds made by certain insects which his friends who have their eyesight can never hope to hear. And when the breeze is in a certain quarter, he can catch the sound of the ocean surf-beat many miles away. Among the pleasures of being blind is the impossibility of seeing ugly sights nor to behold physical deformity and suffering.

No. 102.

A SOCIETY has been formed with the somewhat formidable title of 'The Recreative Evening Schools Association,' its object being to make use of Board School buildings in the evening. It has long seemed a great pity to the organisers of this movement that the large Board School buildings all over the country should not be put to some use in the evening. The society has obtained permission in many cases to make use of these buildings for the purpose of providing entertainment and instruction in the evening for boys and young men. Gymnasiums, popular lectures and readings, as well as instruction in different subjects, will be provided. The idea is most excellent, and deserves every kind of encouragement.

No. 103.

ENGLISHMEN are always in a hurry when they have an object to accomplish; but if there is any vocation or pursuit in which gradual, slow-coach processes are scouted with peculiar detestation, it is that of acquiring riches. Especially is this true at the present day, when fortunes are continually changing hands, and men are so often, by a lucky turn of the wheel, lifted from the lowest depths of poverty to the loftiest pinnacle of wealth and affluence. Exceptional persons there are, who are content with slow gains—willing to accumulate riches by adding penny to penny, and shilling to shilling; but the mass of business men are too apt to despise such a tedious, laborious road to fortune, and rush headlong into schemes for the sudden acquisition of wealth.

No. 104.

SOME insects are remarkable, not only in possessing protective colouring, but also a wonderful change of form, such as the leaf and stick insects, which deceive even the practised eye, so closely do they resemble in shape and colouring the leaves and twigs among which they live. They are for the most part large, soft, defenceless creatures, and would readily fall a prey to the countless multitudes of insect eaters were it not for the almost perfect manner in which they simulate the objects around them.

No. 105.

THE position of a signalman is terribly monotonous, and, except at big stations and important junctions, his official life is the very incarnation of deadly dulness. He endures the same round of duties every day, year in, year out, with very little change or variety. Boxed up in a glass house twelve hours a day, with the eternal ding dong of the bell signals ringing in the brain, till the senses seem numbed, and the work is done almost mechanically; no wonder the nervous system gives way under the strain, and that scores of men leave the signal-boxes to die of premature old age.

No. 106.

A FRENCH naturalist has given an interesting account of an eel which lived in his family for forty years. Its life during that period was encompassed by many unfavourable circumstances. It was kept in an earthenware jar, in which it had to lie coiled up, the water being changed twice weekly. It was fed with small pieces of meat, but only in the summer. On two occasions in winter it was completely frozen up. It seemed to know its keepers, and raised its head slightly up out of the water if it wanted food, or if it was called. After having lived in this way for forty years, it managed, during very hot weather, to escape, but only to its death, as the extremely hot sun soon rendered its gills, or breathing organs, dry and utterly useless for respiration.

No. 107.

FROM time to time hidden treasures of a valuable nature have been unearthed in the freights of street refuse and rubbish which are regularly taken to Sittingbourne from London, and a portion of which is used in the manufacture of bricks. A large heap of this rubbish, many tons in weight, had been for several months on one of the wharves attached to a brick-field, when some boys accidentally came across two or three coins, which, after having the dirt removed, turned out to be sovereigns. A more extended search then took place, in which numbers of men, women, and children eagerly joined. The total sum recovered amounted to about £130, which was equally shared among the searchers.

No. 108.

LACE of every kind is now made by machinery in such perfection that even experts can scarcely tell the difference between the hand-made and machine-made product. There is, however, a delicacy about the hand-made laces that the machine can never equal, and, although the machine-made product is so cheap as to be within the reach of almost any one, and so beautiful as to challenge criticism, the demand for the fine hand-made laces has not in the least diminished, and the prices paid are as high as ever.

No. 109.

OF Thee, O God! this voice is telling,
Thou who art truth, life, hope, and love;
On whom night calls from her dark dwelling,
To whom bright morning looks above;
Of Thee—proclaim'd by every sound.
Whom nature's all-mysterious round
Declares, yet not defines Thy light;
Of Thee,—the abyss and source, whence all
Our souls proceed, in which they fall,
Who hast but one name—INFINITE.

NOTES AND NOTIONS.

BY RICHARD WADDINGTON.

WITH this issue appears an entirely new feature. Everywhere teachers are taking more active interest in scientific matters. It is therefore only fitting that the PRACTICAL TEACHER should meet the growing needs of its readers in this direction. Henceforth the working teacher in search of the 'latest' in the scientific world will find the well-known monthly indispensable. Pupil teachers preparing for the May Examinations and Students in Training will find valuable information on the 'moves' at South Kensington. Not only will queries be answered fully and completely, but Examination Tests will be set and corrected at a nominal fee. The introduction of Object Lessons in the Lower Standards will demand a close acquaintance with developments in scientific subjects. Notwithstanding the popularity of the journal at present, there is no doubt this new departure will make it even more popular. The success of the venture rests very largely with the readers.

In these columns, even when I have felt very strongly, I have endeavoured to deal with crucial matters of Union policy in such a way as not to be unfair to my fellow Unionists who held opposite views to myself. Mr. Turner, in last month's issue, implies that I must rigidly abstain from discussing controversial matter. To this I can hardly agree. Let me assure Mr. Turner that I had no idea of making a personal attack upon him or any other individual. In the August number I wrote, 'The question of pensions for Union officials is rousing opposition in some quarters, and uncharitable remarks are being made about well-paid officials applying for pensions. The facts are these.' No official, well-paid or otherwise, applied for a pension. Therefore to describe the accusation as uncharitable was by no means severe. And Mr. Turner was not specially in my mind any more than the others I have heard express similar opinions.

* * * * *

Mr. Turner complains that I attacked where I was probably considered unapproachable. An attack was far from my mind. My sole object was to state the exact position. But would it not be well for Mr. Turner to remember that the well-paid officials cannot reply to the charge of selfishness implied in the suggestion that they are asking for pensions? I know that the matter has pained Union officials whose service is given in no stinted measure, and I feel that in my anxiety for the financial stability of the Union I have unwittingly induced this criticism. The question is to be discussed at the Manchester Conference, and by them, I hope, referred to the Local Associations for final endorsement or rejection.

* * * * *

Mr. Turner refers to my demand that something should be done to prevent 1,113 certificated teachers working for less than £1 per week. Has the Union done nothing? Can Mr. Turner get a certificated teacher at less than £1 per week to-day? The increased staff required in 1896 will do something more to decrease this 1,113. But I have steadily advocated a levy for dealing with these cases. We want increased aid from the State and a Union strong enough to demand a living wage for the teacher. And in the meantime it is good policy I believe to provide that in the thick of the fight your funds shall not be crippled by the want of foresight of your present Executive.

* * * * *

Mr. Acland's anxiety to rationalise the teaching in our Primary Schools is likely to land us in the throes of overpressure if he is not mindful. The continual adding to the compulsory subjects not only takes all elasticity out of the schools, but makes real teaching impossible. I am not against Object Lessons, Varied Occupations, and Physical Exercises. But they cannot be taught without expense, and they ought to have been preceded by an Act of Parliament making 90 minutes one hour. How much brighter school life might be if the senseless tests in dictation and spelling were abolished and the minute accuracy in arithmetic relegated to a well-deserved oblivion only the teacher can anticipate. Why should not well-arranged playground games take the place of Physical Exercises? Many an old score might be rubbed off if the Inspectorial Staff at their visit would take a turn at football with the boys.

Anticipating August 31st, 1895, a teacher asked H.M.I. what he thought suitable Object Lessons. The Inspector called for his paper, he called for his pen, and he called for his cyclopædia, and wrote—The teacher's summary reads :—

1. The Earth as a member of the Solar System.
2. Other systems and the theories of the universe (Kant, Kepler, Laplace.)
3. Why the Earth keeps its place in space—Newton's laws of motion.
4. The Sun and the theories regarding the maintenance of its heat.
5. Probability of existence of other worlds like our own.
6. General sketch of the different epochs of the earth's history according to the evidence of geology.

My advice to the teacher is to get his lower Standards ready, and present them at the May Examination in Physiography. He might get a pass, and that would pay better than Physiography in the form of Object Lessons without grant.

* * * * *

As I anticipated Messrs. Macnamara and Gautrey are to be candidates at the forthcoming School Board Election. With these two on the Board to help Mr. Horobin, matters will be more lively at the Embankment than hitherto. At Bradford the teachers intend to fill the place vacated by Mr. Boyle with a practical teacher taken straight from the class room. Mr. Cryer has the hearty good wishes of every teacher. At Leeds Mr. Peaker is championing the cause of the teachers in his usual enthusiastic manner. Not only the Leeds teachers but the parents of Leeds will do well for the town by securing the election of Mr. Peaker. The cry for the workers as representatives on local governing bodies grows apace, and this growth must carry the teacher to the School Board.

* * * * *

'Art. 85 (6) does not prescribe manual instruction,' say My Lords of Whitehall. What then are the suitable occupations?

> 'Perhaps it may turn out a song,
> Perhaps turn out a sermon.'

Is the Department afraid to lay down the law until the whims of the inspectors have been fully considered? Or, is the reticence due to the reply to the N.U.T. Executive to the circular on the Instruction of Lower Standards in Schools for Older Scholars? Something must have gone wrong, as this circular suggested 'Drawing with coloured chalks, modelling in clay, embroidery of outlines, formation of geometrical patterns and models, and building with cubes, etc.'

If these are not manual what are they?

* * * * *

None too soon the Executive is taking decisive action on this matter of the additional subjects added by the present Code. Mr. Acland is to be asked to receive a deputation on the subject. It is not a question of want of sympathy with the desire to brighten the teaching of the lower Standards. It is a question of want of time and want of funds.

* * * * *

Mr. Acland's reference to the question of security of tenure in his speech on the estimates was extremely disappointing. With the flagrant cases that are made public week by week, it was to be expected that Mr. Acland would have shown a much more

decisive disposition. It is quite evident from Mr. Acland's speech that his Bill, when it appears, is to do little more than secure the teacher against the imposition of extraneous tasks. It would seem hardly necessary to obtain legislation for this. The Department can stop extraneous tasks at once. But they cannot retain the teacher, and they cannot prevent private arrangements, the breaking of which means the dismissal of the teacher, probably on other grounds. Without reasonable security of tenure, all the legislation that can be heaped on the statute book will be useless in preventing the imposition of extraneous tasks.

* * * * *

TAKE the two most recent cases published. In the Lower Heyford case any legislation prohibiting extraneous tasks would have been useless. And in the case of Mr. Thompson, of Aycliffe, who is dismissed for reasons which cannot be justified, do you think the manager could not find a thousand and one other reasons to assign for dismissal? Of course he could, and the Bill would be inoperative. Without a reasonable amount of security of tenure, a scheme of superannuation would be impossible. Let teachers make it plain in the right quarter that they know what is required.

* * * * *

THE tendency of the present day is toward a compromise on the question of more financial aid for the voluntary schools. Strong partisans on both sides are seeking a *vîâ media*. In Bolton, Church, Roman Catholics, and Wesleyans have placed their schools at the disposal of the School Board for evening continuation school purposes. In each case the Board employs the day school staff for the evening school. In alluding to this arrangement Mr. Broadbent, one of the members of the School Board party on the Board, said: 'When the right opportunity came he should be most happy to vote, where sufficient numbers warranted such a step, that Board Schools should be appropriated where they were required for Roman Catholic children taught by Roman Catholic teachers. He did not think that the slight difference which existed in some respects would prevent eventually the solution of the difficulty in connection with the national system of education.'

* * * * *

THE apathy of teachers is proverbial. Even on matters directly affecting their professional welfare it is difficult to rouse them to a due sense of responsibility. Some time ago the Executive asked, through the columns of the Educational newspapers and the Local Associations, for information as to how far H.M. Inspectors carried out the spirit of the instruction on small detail of criticism. From the replies it would appear that few reports are marred by vexatious and minute criticisms. The days of 'The writing is very good, except for some slight weakness in the First Standard,' would appear to have departed if we must judge by the replies. Is this so? Whenever I attend a Local Association Meeting I hear complaints both loud and deep. Yet, when the opportunity offers the information is not supplied. Why, I know two or three inspectorial districts where the complaint is pretty general, and yet silence reigns supreme when the question is put. Sometimes the Executive is blamed for inactivity. What about the teachers?

'ROBERT OF SICILY.'

(HENRY WADSWORTH LONGFELLOW.)

TEXT.

Robert of Sicily, brother of Pope Urbane
And Valmond, Emperor of Allemaine,
Despoiled of his magnificent attire,
Bareheaded, breathless, and besprent with mire,
With sense of wrong and outrage desperate,
Strode on and thundered at the palace gate:
Rushed through the courtyard, thrusting in his rage
To right and left each seneschal and page,
And hurried up the broad and sounding stair,
His white face ghastly in the torches' glare.
From hall to hall he passed with breathless speed;
Voices and cries he heard, but did not heed,
Until at last he reached the banquet-room,
Blazing with light, and breathing with perfume.
There on the daïs sat another king,
Wearing his robes, his crown, his signet-ring,

ANNOTATIONS.

(49-50) *Robert . . . . . Allemaine.* Notice the satirical way in which the poet introduces the description of the *dethroned* monarch by the same, grand, rhythmical lines which he used, at the commencement, to describe the *throned* monarch.

(51) *Despoiled*, robbed; he had become maddened, and had torn off his robes. (Lat. *despolior.*)
Cf. 'A groom gan despoil of puissant arms.'
(Spenser.)

(52) *besprent*, besprinkled; be, intensive.
Cf. 'Their locks with dew besprent.'
(Drayton's *Polyolbion.*)

(53) *sense*, feeling.
(53) *outrage*, violence.
(53) *desperate*, grievous.
(54) *thundered*, knocked loudly.
(54) *palace*, royal residence. The palace of the King of Sicily was at Palermo. (Fr. *palais*, Lat. *palatium.*)
(56) *seneschal*, one who, in great houses, had the care of feasts and domestic ceremonies; afterwards applied to other officials. (Low Lat. *seneschalcus.*)
(56) *page*, boy servant; often applied to youths of gentle birth attending, rather in formality than for actual service, on a great person. (Fr. *page.*)
(57) *sounding*, which made a noise when trodden on.
(58) *ghastly*, pale.
(58) *torches*, pieces of resinous wood, often soaked in oil, or metal lamps attached to long handles; these were either carried by attendants, or placed in sconces on the walls.
(62) *banquet-room*, feasting-hall. (Fr. *banquet.*)
Cf. 'The mind shall banquet, though the body pine.' (*Love's Labour's Lost.*)

GRAMMATICAL 'HINTS.'

(52) *besprent*, participial adjective.

(51-53) The words in these lines are adjuncts to 'Robert.'

(54) *Strode*, (54) *thundered*, (55) *Rushed*, } predicates of 'Robert.'

(55) *thrusting . . . . . rage*, adjunct to 'Robert.'

(56) *To right and left*, adverbial phrase, modifying 'thrusting'; might be parsed word by word.

(56) *each*, distributive numeral adjective.

(57) *hurried*, predicate of 'Robert.'

(58) *ghastly*, adjective of quality.
N.B.—Lines 49-58 form one compound sentence.

(60) *but . . . . . heed*, simple, adversative sentence.

(60) *did*, auxiliary of emphasis; *heed*, infinitive. *did heed*, emphatic conjugation.

(61) *Until . . . . . room*, this is best regarded as a simple sentence and the lines 59-62 as a compound sentence; the semi-colon at 'speed' prevents *until*, &c., from being regarded as subordinate.

PARAPHRASE.

Stung by the injuries and indignities of which he was the victim, divested of his splendid robes, his head uncovered, panting with haste and bespattered with mud, the infuriated Prince knocked loudly at the outer portal of the royal residence. Gaining admittance, he dashed across the first enclosure, jostling the startled domestics, who vainly tried to stay his progress; then he bounded noisily up the steps, and on through the various anterooms towards the state dining-hall. Utterly regardless of any arresting challenge, his pallid features looking horrid in the dazzling light, he at length entered the beaming and fragrant feasting-chamber.

A Being, apparelled like the King, with the royal diadem on his head and the seal-ring on his hand, occupied the royal chair on the raised platform at the further end of the hall. In face, build, and stature he was Robert's counterpart, though it

TEXT.	ANNOTATIONS.	GRAMMATICAL 'HINTS.'	PARAPHRASE.
King Robert's self in features, form, and height, But all transfigured with angelic light! It was an Angel; and his presence there With a divine effulgence filled the air, An exaltation, piercing the disguise, Though none the hidden Angel recognise. A moment speechless, motionless, amazed, The throneless monarch on the Angel gazed, Who met his looks of anger and surprise With the divine compassion of his eyes; Then said—'Who art thou? and why com'st thou here?' To which King Robert answered with a sneer— 'I am the King, and come to claim my own From an impostor, who usurps my throne!' And suddenly, at these audacious words, Up sprang the angry guests, and drew their swords; The Angel answered, with unruffled brow,— 'Nay, not the King, but the King's Jester; thou Henceforth shalt wear the bells and scalloped cape, And for thy counsellor shalt lead an ape: Thou shalt obey my servants when they call, And wait upon my henchmen in the hall!' Deaf to King Robert's threats, and cries, and prayers, They thrust him from the hall and down the stairs; A group of tittering pages ran before, And as they opened wide the folding-door, His heart failed, for he heard, with strange alarms, The boisterous laughter of the men-at-arms, And all the vaulted chamber roar and ring, With the mock plaudits of 'Long live the King!' Next morning, waking with the day's first beam, He said within himself,—'It was a dream!' But the straw rustled as he turned his head, There were the cap and bells beside his bed, Around him rose the bare, discoloured walls, Close by, the steeds were champing in their stalls, And in the corner, a revolting shape, Shivering and chattering, sat the wretched ape. It was no dream; the world he loved so much Had turned to dust and ashes at his touch!	(62) *perfume*, sweet odour; it was customary to burn fragrant incenses at banquets and to have scented waters in vessels, to counteract the smell of the viands and from the bodies of guests crowded in badly ventilated rooms. (Fr. *parfume*.) (63) *dais*, raised platform at the end of the hall for the more distinguished guests (from Fr. *dais* = a canopy). (64) *signet-ring*, ring with a seal attached, used for the seal-manual of a king. (Fr. *signet*, dim. of sign.) (65) *features*, cast or make of face. (Fr. *feiture*, Lat. *factura*.) (65) *form*, shape or build. (Lat. *forma*.) (66) *transfigured*, changed into a glorified appearance. Cf. Our Lord's Transfiguration on the Mount. (66) *angelic*, heavenly. (68) *divine*, godlike. (68) *effulgence*, radiance. (Lat. *effulgeor*.) Cf. 'The bright and balmy effulgence of morn.' (Beattie.) (68) *filled the air*, a brightness shone from the Angel which illumined all surrounding objects. In St. Matt. xvii. 2 we read, 'His face did shine as the sun.' (69) *exaltation . . . . . disguise*, although the person at the head of the table had the semblance of Robert, the glory of the Celestial Being was clearly manifest. (70) *recognise*, know. (71) *amazed*, astonished. (74) *compassion*, pity. (76) *sneer*, look of scorn. (78) *impostor*, one who pretends to be someone else. (Lat. *impono* = to lay on.) (78) *usurps*, seizes without right. (Fr. *usurper*, Lat. *usurpo*.) (79) *audacious*, impudent. (Lat. *audax* = bold.) Cf. 'In cloudy chair ascending rides audacious.' (Milton.) (81) *unruffled*, free from disturbance. (82) *jester*. In those and later days, kings, barons, and even bishops, used to keep a paid fool or jester to amuse them by witty sayings, clever jests, and amusing pranks. Thus: Henry VIII. had one called 'Will Somers'; Wolsey had one named 'Patch' (vide Harrison Ainsworth). In Scott's *Ivanhoe* (I. 8) we have a splendid description of 'Wamba,' the jester of Cedric of Rotherwood; Shakespeare has a clever portraiture of this character in *King Lear*. (83) *bells*. Scott describes 'Wamba' thus: 'He was provided with a cap having around it more than one bell, which jingled as he turned his head.' (83) *scalloped cape*, a short cloak marked on the edges with segments of a circle, like the valves of a scallop mussel. Palmers had scallops on their broad-brimmed hats to prove that they had been to Palestine (where these mussels abound). (Fr. *escallop*.) (84) *counsellor*, adviser. (86) *henchmen*, body-servants; so called from standing at the haunch (hip) of their master; now often used, satirically, to indicate a person who, for political or other party purpose, attaches himself to some public personage. Cf. 'I do but beg a little changeling boy To be my henchman.' (*Midsummer Night's Dream*.) (89) *tittering*, laughing with restraint. (91) *heart failed*, courage left him. (92) *boisterous*, noisy. (92) *men-at-arms*, soldiers or guards. (93) *vaulted*, arched; so constructed that the masonry or woodwork is kept in its place by the principle of 'circular pressure'; the roofs of many ancient and modern buildings are so built to avoid pillars. (Fr. *voulte*, Lat. *volta*.) Cf. 'The silent vaults of death.' (Sandys.) (94) *mock*, counterfeit. (94) *plaudits*, cheers. The Latin dramas concluded with words addressed to the audience, entitled 'Plaudite' (from *Plaudo* = to clap hands), of which 'plaudit' is an abbreviation. Cf. 'True wisdom must our actions so direct Not only the last plaudit to expect.' (Sir J. Denham's *Of Old Age*.) (95) *beam*, ray of light. (A.S. *beam*.) (97) *rustled*, made a quick succession of small noises. (A.S. *wristland*.) (100) *champing*, biting their food. Cf. 'Foamed and champed the golden bit.' (Dryden.) (101) *revolting*, disgusting. (Lat. *re*, and *volta* = to turn.) (102) *chattering*, making a noise with its teeth. (104) *dust and ashes*, the fabled 'Apples of Sodom' had an enticing appearance, but, when	(63) *another*, indefinite numeral adjective. (64-66) adjuncts to 'King.' (65) *self*, noun, nominative in apposition with 'King.' (66) *all*, adjective, here used as an intensive adverb. (67) *Angel*, nominative after 'was.' (67) *there*, adverb, here used adjectivally, locating 'presence.' (69) *exaltation*, objective case, in apposition with 'effulgence.' (69) *piercing*, imperfect participle, referring to 'exaltation.' (70) *though*, conjunction, subordinative. (70) *though . . . . . recognise*, adverbial clause, modifying 'piercing.' (70) *none*, indefinite pronoun. (73-74) *who . . . . . eyes*, adjective clause, qualifying 'Angel.' (71) *speechless, motionless, amazed*, adjectives, here used adverbially for speechlesly, etc., modifying 'gazed.' (71) *moment*, objective case governed by (for). (75) *Then said*, principal sentence (vide 61, supra, respecting the semi-colon), subject (He). (75) *Who art thou?* noun clause, object to 'said'; but see the note to line 9. N.B.—'Thou' is the subject: in analysis an interrogation is considered as having the same structure as an affirmation. (75) *why*, interrogative adverb. (75) *Com'st*, second person, of which 'st' is a sign. (76) *To . . . . . sneer*, principal sentence; although 'which' is a relative, this sentence does not appear to be subordinate to the questions in the previous line. (76) *which*, relative, here used adjectivally, qualifying (words). (77) *my own*, compound pronoun, emphatic. (79-80) two simple sentences. (82) *Nay*, adverb of negation, modifying (art). (82) *henceforth*, adverb of time, modifying 'shalt wear.' (83) *shalt*, auxiliary of determination, not of tense. (83) *shalt wear*, indicative mood, 2nd person. (85) *when they call*, adverbial clause, modifying 'obey.' (87) *Deaf*, adjective, qualifying 'they.' (88) *thrust*, past indefinite tense. (90) *as . . . . . door*, adverbial clause. (91-94) *for . . . . . king*, adverbial clause, modifying 'failed.' (93) *roar, ring*, infinitives after 'heard.' (94) *live*, infinitive after 'let.' (95) *next morning*, adverbial phrase, modifying 'said.' (95) *morning*, noun, objective case of time, not needing a preposition. Cf. 'It weighed a pound'; *pound*, objective of weight. (96) *himself*, reflexive pronoun. (96) *it*, impersonal pronoun. (100) *close by*, adverb combined with preposition to form an adverbial phrase. Cf. 'near to.' (101) *shape*, nominative in apposition with 'ape.' (102) *shivering*, imperfect participle, referring to 'ape.' (103) *he . . . . . much*, adjective clause, qualifying 'world.'	seemed as if, by some mysterious transformation, he had become glorified. No one, however, realised what had actually occurred. Completely bewildered, the dethroned King could neither speak nor move, but stood regarding his supplanter with amazement and wrath. The Angel, evidently moved with kindly sympathy, inquired of the intruder his name and errand. To this the enraged Prince contemptuously replied that he was 'Robert of Sicily,' and asserted with vehemence his hitherto unquestioned right to the position held by one whom he denounced as a pretender. The assembled visitors rose to their feet and were prepared to use their weapons to punish this daring insult; the Angel, however, betrayed no concern, and calmly told Robert that, instead of being the ruler of the island, he must now take up the part of the court fool. Dressed in the jingling hood and pointed cloak of a buffoon, with a monkey for his companion, he would henceforth find himself at the beck of the lowest retainers about the palace. Regardless of the Prince's menaces or entreaties, the attendants violently expelled him from the Angel's presence, and, to the vast amusement of the youths about the palace, drove him down into the courtyard. His courage now completely forsook him, for, through the open doorway, came the noisy clamour of the armed guards, who were making the lofty arches of the banquet-room re-echo with their satirical cheers. At daybreak he awoke and found himself in the stable. At first the thought ran through his mind that all the hideous occurrences of the previous night were but the product of his own disordered imagination. But the sound of the horses chewing their food; the fool's garb on the littered floor near his couch; the disgusting form of the monkey disconsolately crouching against the cold and damp-stained sides of the building: all presented themselves as stern and unmistakable realities. It was only too true; the pomps and vanities which had been his idols now proved to be utterly delusive and worthless. Time passed away pleasantly in the island; indeed, it seemed as if the golden days, which legends told of as happening when the son of Cœlus reigned, had again come back. Under the gentle sway of the Angel the fields stood thick with promise of rich harvest; the vines teemed with earnest of a plenteous vintage; no lava streams issued from Etna, for her long-limbed captive slept.

TEXT.

Days came and went ; and now returned again
To Sicily the old Saturnian reign ;
Under the Angel's governance benign
The happy island danced with corn and wine,
And deep within the mountain's burning breast
Enceladus, the giant, was at rest.

Meanwhile King Robert yielded to his fate,
Sullen and silent and disconsolate.
Dressed in the motley garb that jesters wear,
With looks bewildered and a vacant stare,
Close shaven above the ears, as monks are shorn,
By courtiers mocked, by pages laughed to scorn,
His only friend the ape, his only food
What others left—he still was unsubdued.
And when the Angel met him on his way,
And half in earnest, half in jest, would say,
Sternly, though tenderly, that he might feel
The velvet scabbard held a sword of steel,—
'Art thou the King?' the passion of his woe
Burst from him in resistless overflow,
And, lifting high his forehead, he would fling
The haughty answer back,—'I am, I am the King!'

Almost three years were ended ; when there came
Ambassadors of great repute and name,
From Valmond, Emperor of Allemaine,
Unto King Robert, saying that Pope Urbane
By letter summoned them forthwith to come
On Holy Thursday to his city of Rome.
The Angel with great joy received his guests,
And gave them presents of embroidered vests,
And velvet mantles with rich ermine lined,
And rings and jewels of the rarest kind.
Then he departed with them o'er the sea
Into the lovely land of Italy,
Whose loveliness was more resplendent made
By the mere passing of that cavalcade,
With plumes, and cloaks, and housings, and the stir
Of jewelled bridle and of golden spur.

And lo! among the menials, in mock state,
Upon a piebald steed, with shambling gait,
His cloak of fox-tails flapping in the wind,
The solemn ape demurely perched behind,
King Robert rode, making huge merriment
In all the country towns through which they went.

ANNOTATIONS.

plucked, were found to be like ashes inside. This expression implies that Robert's glory and pomp had turned to contempt and ridicule.

(106) *Saturnian*. The proper adjective from Saturn, used here in the sense of *golden* or *happy*, in allusion to the time of felicity which a Sicilian legend described as being enjoyed when Saturn reigned. *Saturn*—the son of Cœlus and Terra, and god of heaven, deposed by his son, Jupiter—descended into Sicily and taught men husbandry. (Mythology.)

(107) *governance*, rule.

(107) *benign*, kindly. (Lat. *benignus*.)

(109) *mountain's*, Etna's.

(110) *Enceladus*. The ancient Sicilian peasants supposed that a giant of this name was imprisoned in Etna, whose eruptions were occasioned by his struggles for freedom. *Enceladus*—the son of Titan and Ge—was the leader of a band of giants who attempted to scale the heavens; he was confined in the volcano for his impious audacity. (Mythology.) His name signifies, *He who makes a noise within*. In 1892, when Etna was in eruption, the comic paper *Punch* had a picture of the giant rising through the smoke from the crater.

(112) *Sullen*, gloomily angry. (Fr. *solein*, Lat. *solus* = alone.)

(112) *disconsolate*, comfortless.

(113) *motley*, parti-coloured. Scott, in *Ivanhoe*, says: 'His (Wamba's) jacket had been stained of a bright purple dye, upon which there had been some attempt to paint grotesque ornaments in different colours . . . his legs were cased in a sort of gaiters, of which one was red and the other yellow' (possibly from Welsh, mudliw = changing colour).

Cf. 'A worthy fool, motley's your only wear.'
(Shakespeare.)

(113) *garb*, dress or attire. (Fr. *garbe*.)

(114) *vacant*, meaningless.

Cf. 'The loud laugh that spoke the vacant mind.'
(Goldsmith's *Deserted Village*.)

(115) *monks are shorn*. Monks shaved the top of their scalps, leaving a ring of hair to symbolise Our Saviour's 'Crown of thorns'; this method of wearing the hair is called the *tonsure*.

(116) *laughed to scorn*, derided as contemptible.

(118) *unsubdued*, untamed. (Lat. *sub*, and *ducere* = to lead.)

(120) *earnest*, seriousness.

(120) *jest*, joke.

(122) *scabbard*, sheath. (A.S. *scearb*.)

Cf. 'Nor in thy scabbard sheathe that famous blade.' (Fairfax.)

Cf. also the saying,
'The iron hand under the velvet glove.'

(123) *passion*, suffering. Cf. *Passion Week*, in which Our Lord suffered.

(124) *resistless*, that could not be held back.

(128) *Ambassadors*, representatives of a sovereign power at the court of another. Lord Dufferin is a renowned living ambassador. (Fr. *ambassadeurs*, Spanish *embaxadors*.)

Cf. 2 Cor. v. 20, 'Now then we are ambassadors.'

(131) *summoned*, cited, *i.e.*, called authoritatively.

(132) *Holy Thursday*, the day before Good Friday, not Ascension Day, which we generally call by that name.

(134) *embroidered*, adorned with raised devices in needlework.

(135) *mantles*, garments to throw over the rest of the dress. (Lat. *mantillum*, Nor. Fr. *mantel*.) Cf. Henry Curtmantle.

(135) *ermine*, the yellowish-white fur of an animal of that name, which naturalists say is merely the stoat acclimatised in the Arctic zone. Judges wear ermine.

(137) *the sea*, either the Lipari Sea or the Strait of Messina.

(139) *resplendent*, shining brightly. (Lat. *resplendeo*.)

(140) *cavalcade*, procession on horseback. (From Ital. *cavallo* = a horse.)

(141) *plumes*, feathers.

(141) *housings*, ornamented horse-cloths. (Fr. *housses*.)

(142) *jewelled*, embossed with gems.

(143) *menials*, domestics. (Fr. *mesnier*, from *mesner* = a household.)

(144) *piebald*, parti-coloured. Cf. mag-pie—a black and white bird.

Cf. also 'The Pied Piper of Hamelin.'
(Browning.)

(144) *shambling*, unsteady. (Old Dutch, *schampelen* = to slip.)

(145) *fox-tails*. These were attached to his cloak, being satirical emblems of cunning or wisdom.

(146) *demurely*, gravely. (Fr. *des mœurs*.)

(147) *perched*, sat like a hen on a pole. (Fr. *perche*, Lat. *pertica*.)

(To be continued.)

GRAMMATICAL 'HINTS.'

(109) *deep*, adjective, here used as an adverb of place, modifying 'at rest.'

(110) *at rest*, adverbial phrase modifying 'was,' but equivalent to the participle 'resting.' *at*, preposition. *rest*, abstract noun.

(111) *meanwhile*, compound adverb, modifying 'yielded.'

(112) *disconsolate*, adjective, qualifying 'Robert.'

(115) *are shorn*, passive voice.

(116) *laughed to scorn*, equivalent to 'scorned'; a participial phrase.

(117) *ape*, nominative after (was).

(118) *what* = that which.
that, adjective distinguishing.
which, relative pronoun.

(118) *others*, indefinite pronoun.

(118) *was unsubdued*, passive voice.

(120) *would*, auxiliary of tense; *would say*, indicative mood.

(121) *that . . . . . feel*, adverbial clause of purpose.

(121) *might*, auxiliary of mood, *feel*, infinitive. *might feel*, subjunctive depending on 'that.'

(122) *the velvet . . . . . steel*, noun clause, object to 'feel.'

(126) *back*, adverb of place.

(127-132) *when . . . . . Rome*, complex sentence; not an adverbial clause.

(130-132) *that . . . . . Rome*, noun clause, object of 'saying.'

(134) *them*, indirect object, objective case after (to).

(135) *lined*, perfect participle.

(139-142) *Whose . . . . . spur*, adjective clause, qualifying 'land.'

(139) *was made*, passive voice.

(140) *passing*, verbal noun.

(141) *stir*, objective, after 'with.'

(143-146) *among . . . . behind*, extensions of the predicate 'rode.'

(148) *through . . . . . went*, adjective clause, qualifying 'towns.'

PARAPHRASE.

The while the Monarch bore his doom, a scowl was on his face ; no word passed his lips ; his heart found no comfort. He went about in the quaint livery of the fool, tonsured like a monk, with rolling eyes that seemed to look in space. The nobles derided him ; their sons jeered at him ; his sole companion was the monkey ; he lived on broken meat. But his proud heart was not yet humbled, and when, by chance, they encountered each other, the Angel, in seriousness not unmixed with humour, in accents resolute but gentle—that Robert should see that the thing spoken so tenderly was sternly meant—would ask him if he *were* Robert ; then the sorrow of his heart flowed in full tide from out his lips, and, with his head erect, he would hurl back the response: 'I, none else, am King!'

The third spring was at hand when envoys whose fame was great and widely spread were sent by the German Prince into Robert's court to tell him that their pontifical brother cited them by his bull to appear on Maunday Thursday at the Vatican. The Angel gladly welcomed the messengers and bestowed upon them gifts : robes rich with fine needlework ; cloaks soft-piled without, within white fur ; also signets and stones of the first water. With a noble company of guests and retainers the Angel then sailed across to the Bay of Salerno, and made his way along the beautiful Mediterranean shore towards the Papal States ; and even the sunny Italian landscape was brightened by the rich mantles, gay horse-cloths, feathered hats and helmets, glittering harness and gilt spurs of the noble cortège that wended its way in stately progress towards Rome.

The poor fool was riding in the rear amongst the servants, upon an old parti-coloured pony which could hardly keep up with the other horses, and his scalloped cape fluttered in the face of the monkey, who was gravely seated behind his master. Their grotesque appearance caused intense amusement to the peasantry who stood by the roadsides to watch the cavalcade pass along.

LEGAL AND CODE QUERIES COLUMN.

RULES.

1. All communications must be addressed 'Legal Editor, PRACTICAL TEACHER, Froebel House, St. Andrew's Hill, Doctors' Commons, E.C.,' and must be accompanied by our 'coupon,' duly filled up.
2. Replies will be given *only* in this column, except under the conditions named in Rule 3.
3. If any reader desires a reply by post, such can be forwarded by enclosing, in addition to the coupon, a stamped addressed envelope and either stamps or a Postal Order to the value of one shilling.
4. No original documents should be forwarded, but copies only. We cannot hold ourselves responsible for any losses which occur through non-observance of this rule.

Evening Schools—'M. G. C.'—Some of the articles of the Day School Code apply to evening continuation schools, among them being Article 66, by which teachers who hold their parchment certificate are entitled to claim from the managers, free of charge, a certified copy of the Inspector's report. The report should be certified as correct by the official correspondent to the schools. All certificated assistants possessing parchments can claim a copy.

Marriage Laws—'R. T. S.'—So long as her husband is alive, a wife cannot marry again, but if she has received no tidings of him for seven years, she will not be punished for bigamy should she marry, and afterwards discover that he is alive. The marriage, however, is illegal.

Contract—'M. S. X.'—No claim whatever under the circumstances.

Esquire—'S. G. R.'—The title 'Esquire' is only properly applied when referring to a person who falls within one of the following classes:—(1) The eldest sons of knights, and their eldest sons; (2) the eldest sons of the younger sons of peers, and their eldest sons; (3) esquires created by the Crown by letters patent or investiture; (4) esquires by virtue of their offices, such as justices of the peace, and others who bear office under the Crown; (5) Barristers-at-law; (6) esquires of knights of the Bath; (7) Foreign peers. The possession of estate, however large, gives no right to the title. As the title is at present used, one rather prefers 'Mr.' It is certainly less common.

Needlework—'MISTRESS.'—(1) The cutting-out in material in Standards 5 and 6 does refer to the garments to be made by the girls in the lower standards, but it is not compulsory that the garments should be made during the current year. (2) Every girl in Standards 4 and 5 must show a piece of knitting as well as a garment.

Contract—'M. R.'—It is not absolutely necessary that the letter should be stamped.

Legal Tender—'MONEY.'—The offer to pay a debt in silver or in bronze (copper) coin is only a valid tender up to a certain amount; it being provided by 33 and 34 Vict. c. 10 that gold coin shall be the only legal tender, except as regards sums not exceeding forty shillings, which may be tendered in silver coin; or not exceeding the sum of one shilling, which may be tendered in bronze coins. For all sums above £5, tender may be made in Bank of England notes. (3 and 4 Will. IV. c. 98, sect. 6.)

Scholarship Examination—'MOSES.'—Yes, generally, but there may be slight alterations. (2) War Office, Pall Mall, London, S.W.

Certificate Examination—'ATHER.'—(1) Yes. (2) Write to Her Majesty's Inspector on the subject.

The Religious Compromise—'LONDON BOARD TEACHER.'—I am very glad you have asked me this question, as ideas as to the nature of this 'compromise' are very vague. I know many persons who think that the 'compromise' is national and not merely local to London. 'The compromise' is not embodied in the Act of 1870. This Act forbids the teaching of the dogmas, the catechisms, the formularies of any particular sect. It does not in any way forbid the teaching of religion, nor does it prescribe that such teaching must be given. When the first London Board was formed, they had at once to settle the question, 'Shall we teach religion, and, if so, how?' That Board included such men as Lord Lawrence, Professor Huxley, Mr. W. H. Smith, Lord Harrowby, and Mr. Samuel Morley. A certain section of the Board wished the education to be purely secular, and all felt that it was their duty to teach religion in such a fashion as would be acceptable to the very large majority of London, if it was to be taught at all. On the one side, a party who wished not to have religion taught in the schools, on the other side, a party opposed to this policy. Eventually these two parties agreed to a *compromise*, the terms of which were embodied in the following resolution:—'That in the schools provided by the Board the Bible shall be read, and there shall be given such explanations and such instruction therefrom in the principles of morality and religion as are suited to the capacities of children.' The resolution was passed in 1871. A recent resolution of the Board has inserted the word 'Christian' before 'morality and religion.'

Special Drawing Certificate—'OLD TEACHER.'—You are eligible; apply to the Secretary, Science and Art Department, South Kensington, S.W.

Day Training College—'P. T.'—The nearest to you is Firth College, Sheffield. Write to Mr. E. Drury, at the College, for full particulars.

Religious Instruction—'M. R. L.'—When scholars are withdrawn from religious instruction, it is the duty of the managers to provide secular instruction for such scholars in a room, other than one in which religious teaching is being given.

Scholarship Examination—'A. B.'—(1) Yes, you can sit in December, with a view to entering College in August, 1895. (2) If you fail in December, 1894, only one chance more will be allowed. (3) Unless you feel fairly safe, you should not risk the chance of failure next December.

LONDON MATRICULATION.

PREPARATION CLASS FOR JANUARY, 1895.

BY R. C. B. KERIN, B.A. (LOND.),
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LATIN.

Latin Course for October.

1. Vergil Aeneid V., lines 452–602. Revise lines 1–248 Book V.

2. Grammar: Postgate's Latin Primer (Cassell), §§ 234–250; §§ 295, 296; or Allen's Latin Grammar (Clarendon Press), §§ 318–363; § 392. Revise the verbs that are irregular in the perfect and supine, and in the Syntax work through the cases again.

3. Translation at sight: a couple of pieces a week.

4. Bayfield: Exercises 24–80, the 13th in each.

Notes on Vergil, 303–452.

Additional Notes.

307. Note the poetical use of the infinitive *ferrè* after *dabo*.

309. *caput nectentur*, 'will have their heads bound.' *Caput* is accusative after *nector*, a passive verb used like the middle verbs in Greek.

314. Words like *contentus*, *plenus*, are in Latin followed by the ablative. Hence we have *galea* in the ablative.

316. *corripiunt spatia*, 'hasten over the course.'

317. The word *similis* governs either genitive or dative. The distinction between the genitive and dative given in some grammars is not observed in Latin.

326. This line is often set at examinations, and students should carefully note the variant readings; in one case *-que* is read, in the other case *-ve*.

328. *levi*. Note that the *i* is long. With the *e* short *levis* would mean 'light.'

329. Note that when *ut* means 'as' it does not require the subjunctive. *Caesis iuvencis* is ablative absolute. *Forte*, 'by chance'; *forte* means 'perhaps' after *nisi* and *quasi*.

334. *Euryali* and *amorum* are genitives governed by *oblitus*, 'forgetting,' 'forgetful.'

335. *per lubrica*, 'in the slippery place,' neuter plural adjective used as a noun, as *prima* below.

338. *plausu* and *fremitu* are ablatives of attendant circumstances—'flies on amidst applause and friendly shouts.'

339. *Post*, used as an adverb here.

341. *Implet* is a case of *zeugma*; it governs two objects, *consessum* and *ora*, though it is really only applicable to the first in the sense of 'to fill.' Cf. in Dickens the use of 'in'—'The old lady was carried off in a flood of tears and a sedan chair'—in which 'in' is used in two different senses. *Ora prima patrum* = *ora primorum patrum* is a case of *hypallage*, or transference of an adjective to a word to which it does not properly belong.

342. The use of the infinitive *reddi* after *poscit* should not be imitated in prose. 'He demands that the honour snatched from him by guile should be restored.'

349. Distinguish *mănent* from *maneo* and *mānent*, present subjunctive of *mano*, 'to flow.'

350. *miseror* and *commiseror*, 'to pity,' are followed by the accusative; *miseret* and *misereor* by the genitive. Cf. below *lapsorum miseret*.

354. *Te miseret*. Students should look up accusative case in the grammar and note the impersonal verbs that take an accusative of the person and the genitive of the thing. *Niso* is ablative after *dignus*, which does not take the genitive in good classical prose.

359. *artes*, 'the work of Didymaon.'

360. Sidgwick considers that *Danais* must be the dative of the agent here. To translate it as a dative of disadvantage seems very forced. Translate, 'taken down by the Greeks from the portal.'

364. *Adsit*, jussive subjunctive, 'let him come forward and raise up his hands with bound palms.'

369. *magno murmure*, 'amidst loud cries.' Ablative of attendant circumstances.

371. *occubat*, 'lies buried.'

381. *mŏratus*, from *moror*, to be distinguished from *mōratus*, an adjective derived from *mos*.

385. *Ducere dona iube*, 'order the gifts to be led home.' The Latins, in such cases, use the active infinitive with the subject understood where we use the passive infinitive.

386. Note that the patronymic masculine endings are *-ĭdes*, *-īdes*, *-ădes*, *-ēades*.

387. *gravis*, 'severely.' Adjective used for adverb.

388. *viridante toro herbae*, 'on a green couch of grass.'

389. *tuis tectis*, 'in thy house.'

395. *tardante* and *senecta* are to be taken together.

397. *qua*, 'in which.' Ablative after *fidens*.

400. *moror*, 'care for.'

406. *longe* refers to space, not to time. *Diu* is the Latin for a 'long time.'

414. *contra* governs *Alcidem*. The prepositions *versus* and *tenus* always follow the word they govern. In poetry many prepositions can follow the words they govern.

416. *cănebat*. Note that the *a* is long, and so *cānebat* comes from *cāneo* 'to be white,' and not from *căno* 'to sing.'

423. *media arena*, 'in the middle of the ring.' Note the Latin method of expressing 'the middle of.'

426. *in digitos arrectus*, 'rising on tiptoe.'

430. *pedum melior motu*, 'superior in speed of foot'; *motu* is ablative of respect; the correct prose construction.

Fretus, 'relying on,' is followed by the ablative *inventa*.

431. *trementi*, dative of disadvantage.

433. *Volnera*, 'wounds,' put for the 'blows' which cause the wounds.

435. *Circum* governs *aures* and *tempora*.

436. *mālae*, nom. plural of *māla*, a jaw. Distinguish this from *mălae*, nom. fem. plural of *mălus*, 'evil.'

442. *irritus*, 'in vain.'

446. *ultro*, 'of his own accord.'

449. *radicibus eruta*, 'torn up by the roots.'

451. *primusque accurrit*, 'is the first to run up.'

SOLUTION OF SENTENCES.

(1) 'Instead of learning the laws of grammar, he went away to Rome and stopped there three days.'

Adeo non leges grammaticas didicit ut Romam abiret et ibi tres dies maneret. Alternative rendering: *Cum leges grammaticas discere posset* (or *deberet*) *Romam abivit et ibi tres dies mansit.*

Notes.—(*a*) 'Instead of' followed by a verbal noun in English must not be translated by the gerund in Latin. If nothing is implied as to the duty or opportunity of doing a thing, use *adeo non*, lit. 'to such a degree not,' followed by the indicative to represent the 'instead of' clause, and translate the principal clause in English by an '*ut*' and subjunctive clause in Latin. The literal translation of the above is, 'To such a degree did he not learn the laws of grammar that he went away to Rome,' etc. If, however, it is implied that a person *ought* or *could* have done something which he did not do, translate as in the alternative rendering, using *cum* with the imperfect subjunctive of *debeo* or *possum* to express the 'instead of' clause. The literal translation will then be, 'When (although) he ought to (or could) have learned the laws of grammar, he went away to Rome.' The subjunctive will be required after *cum* when *cum* means 'since' or 'although.'

(*b*) 'To Rome' will be 'Romam,' not 'ad Romam.' See notes in previous numbers.

(*c*) *three days* will be expressed by *tres dies* to denote 'time how long.'

(2) 'It is said that every tenth man was put to death by Cæsar's orders.'

Decimus quisque Caesaris iussu interfectus esse dicitur.

Notes.—(*a*) Where in English we use 'it is said,' 'it seems,' followed by a 'that' clause, in Latin use the personal construction as above, the literal translation of which is 'each tenth man is said to have been put to death,' etc. Do not write *dicitur decimum quemque*, etc.

(*b*) Note the idiomatic way of expressing 'every tenth man.' Note also the position of *quisque*.

(*c*) In translating phrases like 'put to death,' do not look out each separate word in a dictionary, as I have known some to do, but think of a synonym, viz., 'kill.'

(3) 'I persuaded him to go to his father at Rome without laying the matter before the people.'

Ei persuasi ut Romam ad patrem iret nec rem ad populum referret.

Notes.—(*a*) Verbs of persuading require the dative after them, hence *ei* above, not *eum*.

(*b*) After verbs denoting ask, command, advise, and strive, 'to and the infinitive' in English are translated by *ut* and the subjunctive in Latin, hence *iret*. The imperfect tense is used in accordance with the rule for the sequence of tenses.

(*c*) In previous sentences we have pointed out that Latin like *ad patrem Romae* is inadmissible after verbs of motion. You must write *Romam ad patrem*, lit. 'to Rome, to your father.'

(*d*) *without* followed by a verbal noun in English is never translated into Latin by *sine* with the gerund. When the 'without' clause is a long one and follows a positive clause, *nec* is generally used with a verb in the same mood and tense as the preceding verb. The literal translation of the above is, 'I persuaded him to go away and not to lay the matter before the people.'

(*e*) Note the technical phrase for 'lay the matter before the people.'

(4) 'There is no doubt that it is of importance to Balbus whether his friend comes back from Corinth or not.'

Non dubium est quin Balbi intersit utrum amicus suus Corintho redeat necne.

Notes.—(*a*) Negative words of doubting are followed by *quin* and the subjunctive.

(*b*) *interest*, an impersonal verb meaning 'it is of importance.' The person to whom a thing is of importance is expressed by *genitive, not* by dative, hence *Balbi*.

(*c*) *Whether*, in a question, is expressed by *utrum*.

(*d*) *Redeat* is in subjunctive because it is in a dependent question. The tense follows the rule of the Sequence of Tenses.

(*e*) 'From Corinth,' *Corintho*. No preposition is to be used, as Corinth is the name of a town.

(*f*) '*or not*' in a direct question is expressed by *annon*, in an indirect question by *necne*.

(*g*) *Suus*, 'his,' because it refers to the subject of the principal sentence.

(5) 'It is not everyone who would ask him when he will return.'

Non est cuiusvis eum rogare quando rediturus sit.

Notes.—(*a*) *Non est cuiusvis*, lit., 'it is not characteristic of everyone to ask.' This phrase is followed by the infinitive.

(*b*) 'When' in a question is translated by *quando*, not by *cum*.

(*c*) *rediturus sit* is in the subjunctive because it is in a dependent question.

(6) 'Do not indulge your faults if you wish to be a wise man.'

Ne vitiis tuis indulseris si sapiens esse vis.

Notes.—(*a*) A direct prohibition in the second person is expressed by *ne* and the perfect subjunctive, or by *noli* and the infinitive. Here we might have written *noli indulgere*.

(*b*) *indulgeo* governs the dative.

(*c*) *si* is here followed by the indicative in accordance with the normal rule, that the indicative is used after it if the verb in the apodosis, or principal clause, is in the indicative or imperative. The subjunctive when used for the imperative comes under the latter heading.

(*d*) *sapiens*, not *sapientem*, as with the verbs *volo, possum*, etc., when the infinitive is used, the adjective with the infinitive referring to the subject of *volo, possum*, etc., is put in nominative.

Latin Test Paper.

(Solutions can be corrected in accordance with regulations given at end.)

(1) How is the future infinitive passive formed in Latin? Translate (*a*) He says that the city will be captured. (*b*) He thought that the city would be captured.

(2) Give the principal parts of *comperio, aperio, reperio, findo, fido, tondeo, fulgeo, orior, gaudeo, meto, moror, metior*.

(3) Parse *stringat, condidimus, ursae, exsequerer, fusi, latentia, madefecerat, accipient, mănent, mānent, cănis, cānis* (nearly all these words occur in the Vergil).

(4) How are *Patronymics* formed in Latin?

(5) What classes of verbs in Latin are followed by the infinitive?

(6) Translate into Latin:—

(*a*) She who must be obeyed.
(*b*) Love for one's country.
(*c*) All of us went to the country.
(*d*) It is the fairest country on the earth.
(*e*) We hope to conquer the enemy.

French Course for October.

(1) Six pages of translation a week, with a certain amount of written translation.

(2) Grammar: Fasnacht, §§ 87–92; with revision of the irregular verbs of the third and fourth conjugation.

Greek Course for October.

(1) Iliad, 660–750. (Leaf's Edition, Macmillan's Elementary Series.)

(2) In grammar revise the declensions of nouns and adjectives. Read up the augment, noting the two kinds, syllabic and temporal. Note that the augment is put between the preposition and the stem when the verb is compounded with a preposition. Note that the final vowel of a preposition is cut off except in the case of περί and πρό.

Note the verbs beginning with ε that augment the ε to ει, not to η. This is due to the fact that these verbs originally had an initial consonant; *e.g.*, ἴχω was σέχω, the imperfect of σέχω was ἔσεχον; σ dropping out, the two ε's contracted into ει, hence ἴχω has imperfect εἶχον.

Note the verbs that take a double augment like ὁράω. Note when and how verbs admit of reduplication. Note Attic Reduplication. In the Syntax read the cases.

3. Two pieces of translation at sight a week, and some exercises in Underhill's Exercises (Macmillan).

English Course for October.

(1) Hewitt and Beach, pp. 563–582, with revision of pp. 511–532, 546–555: or Morris's Outlines of English Acci-

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dence, Chapter VI., with revision of Chapters IV. and V.; and Beach's Elements, pp. 1–9.

Reference should also be made to Professor Skeat's valuable Primer of English Etymology (Clarendon Press, 1s. 6d.).

(2) History from the end of the reign of Elizabeth to the Execution of Charles I. Revise from Edward I. to Henry VI.

Notes on English Course for September and October.

Grammar. The distinction between *Descriptive* and *Comparative* grammar is this: *Descriptive* classifies, arranges, and describes words as separate parts of speech, and notes the changes they undergo. *Comparative* deals with the growth of language (Morris).

Note that there are two methods of classifying languages: (1) *Morphologically, i.e.*, according to peculiarities or grammatical structure and the ways in which the relation of words to each other is expressed; (2) *Historically.*

By the first method there are three classes of languages:—

(1) Monosyllabic, as Chinese.

(2) Agglutinative, as Turkish, in which two unaltered roots are joined together to form words, and one of the words becomes subordinate to the other.

(3) Inflectional, like our own tongue.

Historically the most important group is the Indo-European, Indo-Germanic, or Aryan, as it is variously called. Be able to write out a full table of the various languages that form the Indo-European group. A great many authorities now hold that the cradle of the race was in Scandinavia, and not in the North of India. Be able to show the relationship of English to the other groups of languages. Be able to prove that English is a Teutonic and not a Romance language. Note that the grammar of English and its inflexions are almost entirely Teutonic, but that its vocabulary is mixed. Note that English as compared to Latin is an *analytic* language and not a *synthetic* language. Distinguish clearly between *cognate* and *derived* words, and avoid such errors as the statement that 'good' is derived from the German '*gut*,' whereas these words are really *cognate* words. Be able to account for the fact that various languages have enriched the English vocabulary. Notice especially the periods at which Latin, French, Celtic, Scandinavian, Italian, Spanish, German, and Dutch words have made their way into English, and be able to quote words introduced at each period.

Skeat, in his Primer, notes that several Latin terms introduced after the introduction of Christianity are really Greek words in a Latin dress, *e.g.*, *apostle*. He also notes that many of our Arabic words have come into English through the medium of Latin. Two canons of etymology are laid down by him. 'Before attempting an etymology ascertain the earliest form and use of the word, and observe chronology. If the word be of native origin, we should next trace its history in cognate languages. If the word be borrowed, we must observe geography and the history of events, remembering that borrowings are due to actual contact.' As an instance of error due to the non-observance of these canons is given the popular derivation of 'sirloin,' from 'sir' and 'loin,' because King James I. knighted a loin of beef.' The word is found in the time of Henry VI. in an entry—'A *surloyn* beeff viid.'

Next month we shall give notes on the various periods of English, the alphabet and modern English spelling. We recommend all our readers to work the paper set below, which consists entirely of questions which have been set at Matriculation.

ENGLISH PAPER.

(1.) How do we find names for the new things that from time to time have to be expressed in words, *e.g.*, for new games, new inventions, new political or social ideas? Give instances.

(2.) Show how the languages of the Celts, the Romans, the Danes, and Normans have at different times affected the English tongue.

(3.) Express in a tabular form the relationship of English to the other European languages.

(4.) Explain as carefully as you can how our language comes to contain so many words of Latin descent. Mention some that we might very well do without or might well have done without.

(5.) Why is the speech of the peasants in Yorkshire so different from that of the peasants in Devonshire? And why are both so different from the English of literature?

(6.) What languages had already been talked in this island, or were being talked in it, when the Anglo-Saxon Conquest took place? Were they in any way akin to the dialects spoken by the Angles and the Saxons?

(7.) What do you mean by Doublets? Give six examples.

MATHEMATICS.

Arithmetic Course for October.

Percentages, Present Worth, and Discount should be carefully got up, and the earlier parts of the Arithmetic should be kept up by the working of miscellaneous examples.

The following is an illustrative example:—

(1) The present value of a sum of money due 3 years hence is £150; in 2 years' time it will be £160 3s. 4d., find the rate per cent., compound interest. (Jan. 1894.)

Let the per cent. be such that in 1 year £1 amounts to £R.

Hence in 1 year the £150 will amount to £150R, and therefore in 2 years to $150R^2$ (since the 150R will amount to $150R^2$ in 1 year).

Thus in 3 years the £150 amounts to £$150R^3$.

Hence the sum of money of which £150 is the present value is £$150R^3$.

Similarly £160⅓ is the present value of £160⅓R (being due 1 year hence).

Therefore $150R^3 = 160\frac{1}{3}R$;

$\therefore R^2 = 9\frac{1}{3} \times \frac{1}{150} = \frac{28}{900}$;

$\therefore R = \frac{21}{30}$.

Hence the per cent. is such that

£1 becomes £$\frac{21}{20}$ in 1 year,

or £100 becomes £$\frac{2100}{20}$ in 1 year;

$\therefore$ per cent. $= \frac{2100}{20} - 100 = 103\frac{1}{2} - 100 = 3\frac{1}{2}$.

This semi-algebraic method is most important for the working of some problems on Interest.

Note that the R is a multiplier, by means of which given the principal at the beginning of a year we can find its amount at the end of the year.

Thus taking a principal of £150,

amount at end of 1 year = £150R;

amount at end of 2 years = amount of £150R at end of 1 year $= 150R^2$;

amount at end of 3 years = £$150R^3$.

Note if the per cent. is 5,

R = amount of £1 in 1 year

= £$\frac{105}{100} = \frac{21}{20}$.

Note the difference between 'true' and bankers' discount. True discount is the interest on the present value.

Thus the true discount on £100 due 1 year hence at 5 per cent. is £$4\frac{16}{21}$,

since £105 has a discount £5,

and $\therefore$ £100 has a discount $\frac{5 \times 100}{105}$, or £$4\frac{16}{21}$.

The bankers' discount would be simply the interest on £100, that is £5.

Algebra Course for October.

Geometrical Progression may be studied by those who are thoroughly at home with Arithmetical Progression, and for those who are well up in the Algebra a slight knowledge of Harmonical Progression will be found serviceable.

Note and contrast the methods of inserting a given number of Arithmetical or Geometrical means between 2 numbers.

Get up proofs of the facts.

(1) The Arithmetical mean between a and $c = \frac{a+c}{2}$.

(2) The Geometrical mean between a and $c = \sqrt{ac}$.

(3) The Arithmetical mean between $\frac{1}{a}$ and $\frac{1}{c} = \frac{2ac}{a+c}$.

Note the common difference of an A. P. is found by taking any term and subtracting the previous one from it; the

common ratio of a G. P. by taking any term and dividing it by the previous one.

Below are a few worked out examples.

(1) Find three numbers in A. P. whose sum is 21, and product 315.

Let $a - d$, a, $a + d$ be the three numbers.

Then $(a - d) + a + (a + d) = 21$; (1)

and $(a - d)\,a\,(a + d) = 315$. (2)

From (1) $3a = 21$, or $a = 7$.

Substituting in (2), which may be written

$$a(a^2 - d^2) = 315, \quad (2)$$

we get $7(49 - d^2) = 315$;

$\therefore 343 - 7d^2 = 315$,

giving $d = \pm 2$.

Hence $a - d = 5$, or 9,

$a + d = 9$, or 5.

Hence numbers are 5, 7, 9,

or 9, 7, 5.

(2) If b be the Arithmetical, and mb the Geometrical mean between a and c, prove that $\frac{1}{a}$, $\frac{1}{m^2b}$, and $\frac{1}{c}$ are in Arithmetical Progression.

The Arithmetical mean between $\frac{1}{a}$ and $\frac{1}{c}$ is $\frac{\frac{1}{a} + \frac{1}{c}}{2}$, or $\frac{a + c}{2ac}$.

We hence have to prove

$$\frac{1}{m^2b} = \frac{a + c}{2ac}.$$

Since b is Arithmetical mean between a and c,

$$\therefore b = \frac{a + c}{2}. \quad (1)$$

Since mb is Geometrical mean between a and c,

$$m^2b = ac. \quad (2)$$

Dividing (2) by (1):

$$m^2b = ac \div \frac{a + c}{2} = \frac{2ac}{a + c},$$

or $\frac{1}{m^2b} = \frac{a + c}{2ac}$ = Arithmetical mean between $\frac{1}{a}$ and $\frac{1}{c}$.

For the benefit of those acquainted with Harmonic Progression, we may mention that a, m^2b, and c are in H. P.

(3) Prove by Geometrical Progression that $\cdot\dot{3} = \frac{1}{3}$.

$\cdot\dot{3} = \cdot3 + \cdot03 + \cdot003 + \cdot0003 + \ldots\ldots$ to infinity

$= \frac{3}{10} + \frac{3}{100} + \frac{3}{1000} + \ldots\ldots$

$= \frac{\frac{3}{10}}{1 - \frac{1}{10}} = \frac{3}{10} \times \frac{10}{9} = \frac{3}{9} = \frac{1}{3}$.

Euclid Course for October.

Read IV. 5 to end, with special attention to IV. 10.

Hints on September riders:

(1) On given base AB describe a segment ACB of a circle capable of containing an angle equal to given vertical angle. Complete the circle of which ACB is a segment; this circle is divided into two segments by AB, viz., ACB and BDA. Bisect BDA at D; join D to P, the given point in AB, and produce DP to meet circumference again at C. C is then vertex of triangle.

(2) Let AB be given base; on it describe a segment so as to contain an angle equal to given vertical angle. Let C be any point on this arc, and CD perpendicular to AB. Then area of $\triangle ABC = \frac{1}{2}CD, AB$, and is greatest when CD is greatest, *i.e.*, when C is highest above AB, which is clearly when D bisects AB; in which case the triangles ADC, BDC, are equal in all respects, so that CA = CB.

(3) is similar to latter part of IV. 11.

Work following riders:

(1) If a square and a rectangle have the same area, the diagonal of the square is less than that of the rectangle.

(2) Having given that 180 degrees are the measure of two right angles, find the number of degrees in the vertical angle of the isosceles triangle of IV. 10.

(3) DB is a straight line perpendicular to the diameter PA produced of a circle PEA; E is any point on the circumference, and PE produced meets DB in D; prove rectangle PE, PD = constant (for all positions of E).

MECHANICS.

Course for October.

The Hydrostatics should be continued this month. Read and tabulate the various experimental ways of finding the S.G. of solids and liquids, and get up a description of the instruments used for such determinations.

Note if W = weight of a substance,

w = weight of an equal volume of water,

s = specific gravity of substance,

$W = sw$.

Thus, required to find the weight of 10 cubic feet of mercury, S.G. 13·9.

$W = sw = 13{\cdot}9 \times 10 \times 1{,}000$ ozs.

$= 139{,}000$ ozs.

Note the conditions of equilibrium of a floating body.

(1) Its weight = weight of fluid displaced.

(2) The centres of gravity of the body and fluid displaced are in same vertical line.

Note also pressure on any area immersed in a fluid = weight of a volume of same fluid, base the area in question, and height, the depth of the C.G. of the area from the surface of the fluid.

We append a few examples:—

(1) A cube (side 6 inches) is suspended in water with its upper face horizontal, and at a depth of 18 inches. Find pressure on one of its vertical faces.

Area of a face $= 6 \times 6$, or 36 sq. in.

Depth of top of face = 18 in.

Depth of bottom of face = 24 in.

$\therefore$ depth of its C.G. = 21 in.

$\therefore$ required pressure = weight of 36×21 cub. in. of water

$$= \frac{36 \times 21{,}000}{1{,}728} \text{ ozs.}$$

$= 437\frac{1}{2}$ ozs.

(2) A specific gravity bottle full of water weighs 100 grms.; 50 grms. of a solid are introduced, the overflowing water removed, and it is found to weigh 120 grms. Find S.G. of solid.

Bottle full of water + solid (not immersed in bottle) weigh 150 grms.

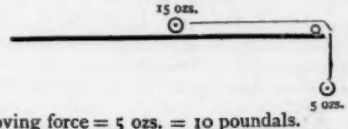
Bottle full of water and solid in it weigh 120 grms.

$\therefore$ weight of water overflowed = 150 − 120, or 30 grms.

$$\therefore \text{S.G. of solid} = \frac{\text{weight of solid}}{\text{weight of equal volume of water}} = \frac{50}{30}$$

$= 1{\cdot}6$.

(3) A mass of 15 ozs on a smooth horizontal table, 36 feet from the edge, is connected by a string to a mass of 5 ozs. hanging over. How long a time will elapse before the 15 ozs. is pulled over the edge, and with what velocity will it arrive there?



Here moving force = 5 ozs. = 10 poundals.

Mass moving = 20 ozs. = $\frac{20}{16} = \frac{5}{4}$ lbs.

Hence using formula $P = mf$,

$10 = \frac{5}{4}f$;

$\therefore f = 8$ ft. per sec., per sec.

Hence $f = 8$, $s = 36$, t ?

$s = ft^2$,

$36 = 4t^2$.

$\therefore t = 3$.

Also $v = ft = 24$.

CHEMISTRY.

Course for October.

Sulphur, phosphorus, and silicon may be studied this month. Note that all three have allotropic modifications. Notice the behaviour of sulphur at various temperatures. The preparation and properties of sulphuretted hydrogen, sulphur dioxide, and sulphuric acid will need careful attention.

Note the action of strong boiling H_2SO_4 on copper, viz.,

$$Cu + 2H_2SO_4 = CuSO_4 + 2H_2O + SO_2,$$

and that of dilute H_2SO_4 on zinc,

$$Zn + H_2SO_4 = ZnSO_4 + H_2.$$

The preparations and properties of P_2O_5 and H_3PO_4 should also be got up.

Examples worked out.

(1) 32·5 grms. of Zn are dissolved in H_2SO_4, what is volume of H given off? (Zn = 65.)

$$Zn + H_2SO_4 = ZnSO_4 + H_2;$$

or 1 atom of Zn gives rise to 2 atoms of H;

$\therefore$ 65 grms. of Zn to 2 grms. of H;

$\therefore$ 32·5 grms. of Zn to 1 grm. of H, *i.e.*, 11·2 litres of H.

(2) What volume will 10 litres of H at 760 mm. pressure, and 0° C. temperature, occupy at 200 mm. and 100° C.?

The temperatures 0° C. and 100° C. correspond to 273 and 373 of absolute temperature (reckoned from − 273 C.).

Considering the rise of temperature only, the volume is increased in ratio 373 : 273, *i.e.*,

$$= \frac{10 \times 373}{273} \text{ litres.}$$

Now allowing for decrease of pressure, the volume will be increased in ratio 760 : 200, *i.e.*,

$$= \frac{10 \times 373}{273} \times \frac{760}{200} \text{ litres}$$

$$= 52 \text{ litres approximately.}$$

MATHEMATICAL TEST PAPER.

(1) If A and G be respectively the Arithmetical and Geometrical means between a and c, and H be the Arithmetical mean between $\frac{1}{a}$ and $\frac{1}{c}$, prove that A, G, and H are in Geometrical Progression.

(2) Sum to infinity the series:

$$1 - \cdot1 + \cdot01 - \cdot001 + \ldots\ldots$$

(3) Prove $(x^2 + y^2 + z^2 - xy - xz - yz)^2$

$= (x-y)^2(y-z)^2 + (y-z)^2(z-x)^2 + (z-x)^2(x-y)^2$.

(4) A bar projects 6 ins. beyond the edge of a table, and 2 ozs. hung on to the projecting end just upsets it; when it is pushed out so as to project 8 ins., 1 oz. will suffice to upset it. Find weight of bar and the distance of its C.G. from the end.

(5) A cylinder (weight 1 lb.) floats in water (axis vertical and ends horizontal), a weight of 4 ozs. placed on its upper surface just depresses it to the level of the water. Find specific gravity of cylinder.

Correspondence.

Teachers wishing to have their test papers corrected should send the same addressed to the 'Matriculation Editors,' care of Joseph Hughes and Co., Froebel House, St. Andrew's Hill, Doctors' Commons, London, E.C., and enclose a remittance of 6d. for each paper.

Students desiring to have the papers set in previous numbers corrected can have them corrected on the same conditions.

The Matriculation Editors will be pleased to reply briefly through these columns to those seeking advice.

ELEMENTARY LESSONS IN HORTICULTURE.

BY PROFESSOR J. R. GREEN, SC.D.,
Late Examiner in Botany to the University of Cambridge, and
F. L. GREEN,
Late Science Mistress in the Clifton High School.

X.—FUNGUS PESTS.

We have seen that plants suffer from a great variety of insect foes, demanding almost ceaseless care from the cultivator, but these are not the only enemies with which he has to contend. Fungus pests are very troublesome to the horticulturist, as well as to the farmer.

The potato, our most useful garden vegetable, is especially subject to the attacks of fungi. Let us first look at a plant attacked by *Peziza postuma*. Within and without it is covered by a thick felt of white fungus spawn or *mycelium*, and immersed in this thick felt are thousands of small black nodular bodies varying in size from a grain of sand to that of a small bean. If one of these bodies be examined by the aid of a good microscope we shall see that it consists of highly condensed, compact spawn cells which are white in the centre and gradually get black towards the outside. Such a nodule is called a *sclerotium*. By means of *sclerotia* certain fungi, which would probably be destroyed by severe frost or prolonged drought, are kept alive through inclement seasons. The spawn having compacted itself into these hard little masses, falls to the ground and remains uninjured by continued cold or drought. Generally they hibernate for a period of from nine months to a year. Then germination takes place and (in this case) a cup-shaped fungus is produced which is supported by a long stalk. Each stalk is long, slender, and tortuous, and is about two inches in height. The cup is about half-an-inch across, and from its surface millions of minute dust-like spores (*sporidia*) sail away through the air. If we now cut one of the cups in two and examine a thin section of the top with a high magnifying power, we shall see that the upper stratum consists of elongated perpendicular cells, while the under surface is a mass of spherical cells of different sizes. Each long, colourless, bladder-like cell, or *ascus*, contains eight oval spores which are called *sporidia*, because of their being carried free in a transparent bladder. So small and slender are the *asci* that on the top of each expanded cup more than 300,000 are packed side by side. These give rise to 2,500,000 sporidia, a great many of which are destined to perish. The rest, if no remedial measures are taken, will, on falling on potato plants, germinate, cover the stems with spawn, and presently reduce the whole of the stems and leaves to tinder, the entire moisture of the stem and leaves being exhausted by the fungus. Now if the parts of a potato plant which are above ground get seriously injured or destroyed, there will be little or no further growth in the tubers. The potato crop will be a failure. In the case of this fungus pest, the best remedy is prevention, guarding the next year's crop. No infected stems must be allowed to rot in the fields. They must all be carefully gathered together and burned; and if, on examining the stems, it is

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seen that many of the *sclerotia* have dropped from them, it is very advisable to rake and burn the top surface of the ground.

We come, now, to the consideration of two very destructive fungi, *Fusisporium Solani* and *Peronospora infestans*, which are often found in company on the same plant.

Fusisporium Solani derives its name from the spores being spindle-shaped. From a floccose bed of spawn spring threads which carry spores attenuated at both ends and curved like a crescent. At first each spore is simple; but at length it is furnished with three joints, or *septa*, dividing the spore into four pieces, each of which, when at maturity the spore falls to pieces, is capable of germination. It is very easy to realise the rapid growth of this fungus. We will place a very thin transparent section of a sound potato on a glass slide and put some of the spores and threads of the *fusisporium* near the edge of the slice, keeping the section moist. In about six hours the small hibernating spores will burst, producing a perfect *fusisporium*. The mycelium speedily reduces potato tubers to a loathsome, putrid mass, breaking up the cell walls and injuring the contained starch. This fungus pest is not peculiar to decaying potatoes, for it grows rapidly, as we have seen, on potatoes which are undiseased, if they are bruised or cut. It is very common and highly destructive in the southern and midland counties of England, but is of rare occurrence in the north and north-west. To check its attacks, all affected matter should be burned, and great care should be taken not to allow any decayed potato refuse to remain in the garden.

The potato disease *par excellence*, *Peronospora infestans*, besides attacking the cultivated vegetable, grows on the wild potato plants of Peru, and is often very troublesome when tomatoes are grown out of doors. In Europe it seldom appears before July or August, though on rare occasions it has appeared in May and June. Its ravages generally begin during close, humid weather, when the mornings and evenings are misty and the days are hot, damp, and stormy—meteoric conditions which are very favourable to the growth of fungi. On the lowermost leaves of potato plants, where the air is moister and more stagnant than it is further from the ground, a fine white bloom appears, accompanied by dark, putrid spots. This bloom, with its black blotches, soon travels to the stem, and when at length the tubers are reached, they are commonly traversed in every part by the spawn of the fungus. When the weather is warm and humid sometimes the black blotches are seen for several days on the leaves before the white bloom appears. The peculiar offensive odour which accompanies this disease is caused by the putrescence set up in the tissues of the potato plant by the contact of the spawn of this potato fungus. Its attacks appear to be very sudden where the existence of the fungus in a nascent state has escaped notice. "One day," says an observer, "during the last week in August, as we brushed through the dark green foliage of a magnificent field of potatoes at Ballyshannon, earthy, disagreeable odours rose from the plants. On the following morning the entire crop looked as if it had been exposed during the night to the action of steam. Stems and leaves were soft, pulpy, and blackened. In six-and-thirty hours a few sickly stems and discoloured leaves were all that remained. The crop had ceased to exist." The fact is that, as we said before, the fungus of the potato disease generally attacks the leaves first. As the leaves produce successive crops of fungus growth, the pest quickly spreads to the leaf-stalks, thence to the chief stems, and from the stems to the tubers. Though the disease at first starts from a few centres only, *Peronospora infestans* possesses wonderful powers of spore production and rapid growth, especially when the air is moist and the temperature ranges between 60° and 70° Fahrenheit.

To examine the structure of this fungus a very thin transparent slice should be taken from one of the exposed cut surfaces arising when a leaf is cut in two through a disease-spot. The slice should be somewhat longitudinally wedge-shaped, and should be placed under a high magnifying power.

The fungus is then seen to be perfectly transparent, like colourless glass, and extremely fine and thin in all its parts. In its growth it is tree-like. All the branches are more or less constricted or jointed, and each joint has at one time carried a *conidium* or transparent spore, the lower *conidia* having been pushed off as the branches have continued their growth. The fruiting stems are called *conidiophores*. When the ripe conidia are placed in water, the interior mass of each conidium divides into from five to nine portions, each of which is furnished with one or more vacuoles. When placed on a moist surface each portion, now known as a *zoospore*, becomes free, and is soon furnished with two extremely fine hair-like tails. After a time these zoospores rest and take a globular form, and the vibrating hairs disappear. In their next stage they burst and produce a thread of spawn which is capable of carrying on the existence of the fungus.

Its method of distribution varies. Millions of conidia are carried through the air by the wind, for they are very small and light, and slightly attached to the fruiting stems. The insects which alight among potato plants carry off hundreds on their bodies, and the fluttering of the wings of birds which drop in potato fields also help in their distribution. Water or moist air, however, is necessary to the existence of the fungus, which speedily perishes in dry air, heat, or frost.

Let us examine now a little more closely the passive state of the potato disease. If a number of leaves be taken from potato plants invaded by *Peronospora infestans*, then slightly moistened and placed one over the other inside a bell-glass, which is placed downwards on some flat surface, and a saucer of water be placed underneath to keep the air humid by evaporation, an enormous number of *oospores*, or resting-spores, will be given rise to. Another certain source of resting-spores may be found in old, diseased, and damaged tubers that have been unwisely left on the ground to rot, or have been thrown on to manure heaps.

In colour the oospores are of a pale brown tint. The protoplasm, from a loose, transparent, finely granular mass, becomes compact and slightly convolute. Generally it is in one coil, but at times it may be in two or three distinct portions, which on germination will produce one, two, or three germ tubes. In other cases the interior mass of protoplasm is differentiated into zoospores, which escape, come to rest, and

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germinate. On germination the walls of the oospore break up into many pieces, often into fine dust.

With the supporting plant every part of the potato fungus perishes except the oospores. They are left alive on or in the ground when potato material has decayed, and, germinating in June, produce the first conidia of the season.

Skilful culture and perfect winter storage are the best remedial and preventive measures that can be taken in the case of this fungus pest. When cut sets are used at planting, the cut surface should be allowed to heal or dry before planting, or it should be quickly passed over a hot iron. Hardy varieties should be selected and grown in well-drained dry soil, manured with mineral manure. Every diseased part of the potato plant should be burned, or, if burning is impracticable, buried deeply in the ground. Dead stems, leaves, and tubers left on the surface of the soil will infallibly spread the disease. We have seen that darkness, heat, and moisture are highly favourable to the growth of the fungus. It follows that the storing places of potato tubers should be perfectly dry and airy, and should have a certain amount of light. Storing them in the enormous damp underground heaps called *pies* is one of the best means for propagating the disease.

Earthing up potatoes is strongly recommended by many growers. It not only helps to support the potato haulms in an erect position, but keeps them free from the attacks of wire-worms, slugs, snails, rabbits, rats, etc., and prevents them from cracking after exposure to sun, hail, rain, and wind. A potato that is bruised or scratched, with its inner substance exposed, is, it must be remembered, rendered thereby more liable to the attacks of fungus pests. It has a drawback. The yield of large tubers is decreased. On the other hand, even when the haulms have been completely destroyed by the fungus, earthed up potato tubers have been found to be free from the pest. Various dressings are used by growers, but are of service only in the beginning of this disease.

Potatoes are also subject to the attacks of smut, *Tubercinia scabies*, an olive-green or brownish fungus, which grows beneath the bark of the tuber, where it forms a thin dark greenish-brown layer. Its presence may be detected by the occurrence of discoloured blotches on the bark. Often no trace of this pest is seen when the tubers are harvested, stored potatoes, which at the time of digging seemed quite sound, often contracting small discoloured spots on the skin of the tubers, which increase in size and run together till the whole skin of the potato is discoloured. The cuticle then bursts in many places, liberating the olive-green spores. Care must be taken not to plant seed potatoes exhibiting traces of smut.

Injuries often confounded with smut in potatoes are the brownish scab on the skin or bark, and the cracking of the bark generally due to the presence of some irritative or corrosive substance in the soil, such as lime rubbish, builders' refuse, and refuse from ashpits. Continued drought and also superabundant and sudden moisture will also cause potatoes to scab. When the skin is carefully removed, small depressions or pits are seen in the substance of the tubers which in bad cases are excavated deeply. Cracked and scabbed potatoes are unmarketable, possessing an earthy, disagreeable taste, and if *Peronospora* or *Fusisporium* light on the exposed places, the destruction of the tuber is soon complete.

(*To be continued.*)

REVIEWS.

Intelligent Spelling. London: The Education Union.

In this manual the words are linked together according to their deeper affinities of meaning, the associations of similarity being thus called into play to endow the form with some amount of meaning. The idea is a good one, and is well worked out by the writer. The sentences at the end of the book in illustration of the way in which it should be used form a very useful feature, whilst some sensible remarks and advice are to be found in the introduction. Altogether the volume is one which will well repay perusal and adoption.

The Citizen: His Rights and Responsibilities. By Oscar Browning. London: Blackie and Sons.

This volume contains an exposition of the rights and duties of a citizen, which is fairly complete and everywhere careful and accurate. It is suitable as a text-book for the teacher, who will find within its covers reliable information upon the thousand and one points touched upon by Mr. Acland in the syllabus contained in the evening school Code. The book contains no illustrations, and the style of composition is not sufficiently attractive to sustain the attention of any but students of a larger growth. To all such the book would be found satisfying if not intensely interesting.

Drill for the Standards. By A. Alexander. London: Geo. Philip and Sons.

Within the two covers of this latest manual of drill will be found all that the teacher will require for the introduction and perfection of drill instruction in his school; furthermore, all classes of elementary schools are catered for. Standards I. and II. have Calisthenics (with or without apparatus), Light Pole Exercises and Calisthenic Rings. Standards III. and IV. Desk Drill without Apparatus, Military Gun Drill, and Swimming Drill. Standards V.–VII. Grecian Exercises, Light Dumb-bells, and Bar Bells. In addition to which are given Swedish and Marching Exercises for all the standards, and in conclusion a list of Musical Drills and Exercises suitable for use in the standards. The accompanying music is in every way just what is wanted, so that Mr. Alexander can be congratulated upon having produced a book competent in every way to fill codal requirements.

The University Tutorial Series. A Manual of Ethics. By John S. Mackenzie. Second Edition. London: W. B. Clive and Son, University Correspondence College Press.

A few years back an elementary book on the science of Ethics was far to seek. This, thanks to Mr. Mackenzie and several other writers, is no longer the case, so that the students preparing for University examinations have need to be thankful for the smoothing of the way to a knowledge of this part of their work. Of Mr. Mackenzie's effort nothing but good can be said. His point of view is 'that of the school of Idealism—*i.e.*, the school founded by Kant and developed by Hegel, Green, and others.' Every paragraph affords evidence of the care that has been taken to render full assistance to the self-teaching student. In our opinion the most successful chapter is that which treats of the Freedom of the Will, pp. 140–152; the least satisfactory is that on the relation of ethics to religion, which strikes us as being somewhat scrappy;

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for this we are told in Note VI. of Appendix B, that want of space and the complicated nature of the subject are to blame. The wealth and judgment of the quotations are a strong point in the book, whilst the direction as to the future reading of those readers who feel the force of the allurement 'to brighter worlds' is simply admirable. In our opinion Mr. Mackenzie's book is a model introduction to the interesting and important subject of which he is such a lucid expounder. For London University candidates the book is simply indispensable.

Elementary Education. London: The Education Union.

With the greater part of this book we are exceedingly pleased. The writers are evidently aware of what is implied by the 'new education,' and show a gratifying anxiety to bring home to their readers a true estimate of what is meant thereby. Chapter I, for example, deals with the truism that school-life should be happy, and we are heartily with the authors in agreeing that 'The best equipment for the toil and trouble of adult age is a happy childhood.' Furthermore, the chapters on the teaching of the various subjects are characterised by soundness. This does not prevent the book from degenerating at times into twaddle, making one wonder at the unevenness of the exposition. Here, for example, is the patent way whereby an organiser taught a school of 1000 rough boys to abstain from walking in the road. 'Did I proceed to lecture the boys on the subject—threaten punishment, etc., etc.? No: seeing I was all but a stranger, I should probably have made matters worse. But, going into school one morning, I simply requested my teachers to write on every black-board the words, "Donkeys run in the middle of the street." I instructed them to offer no explanation, but merely desired the children to write out the sentence 20 times for a home-copy. That set the whole town talking about it—just what I wanted. At the end of a week no boy was found occupying the middle of the road!' We question the good taste and wisdom of the introduction of the following in a work on school-management:—'It were a vital error to suppose that the facts of science could be really at variance with the truths of Revelation. Man's own blunders and erroneous conclusions have often run contrary to Revelation (as may well be supposed), but the truths of Nature—never. How could it be so when the inspired Word is one way, and Nature only another way in which the Father manifests Himself to His children?' This strikes us as somewhat hysterical and altogether uncalled for. It is, however, when the authors of this, in many respects, excellent work, begin to harangue teachers that our ire is most tempted to rise. For example, 'it is a sorrowful fact that there are teachers who take every opportunity of announcing that they cordially detest both children and the teaching profession.' Why do they teach, then? Surely not for gain, for that does not generally fall to the teacher's lot. Perhaps it is meant that teachers, whilst liking their calling, do not abstain from bitter complaint against galling conditions that could easily be removed if managers were more reasonable. The reasoning by which compulsory education is shown to be a delusion and a snare does not appear to us to be very convincing. 'But the belief that a love of knowledge for *its own sake* may be engendered by drastic measures—such as summoning to police-courts and punishment with fine and imprisonment—argues an entire ignorance of human nature. Such a policy will but increase the evil, and day by day deepen the natural aversion to compulsory education.' Nobody pretends that compulsion will directly beget a love of knowledge: it will, however, send the children into the schools, and here they are certainly more likely to take on a love for knowing than they would do in the streets. We cannot conscientiously recommend the book in its present form. If, however, the writers will expunge those parts giving one the impression that the purpose they have in hand is something other than that of writing an exposition of school method, the book may be made to rank high amongst manuals on school management. At present we feel much the same as children do when beguiled into reading a 'goody-goody' story book. Let the cobbler stick to his last, perhaps, expresses what we mean.

The Principles of Ornament. By James Ward, Macclesfield School of Art. Edited and Revised by Professor Aitchison, A.R.A., Government Examiner in the subject. London: Chapman and Hall.

Here is collected information for which art students had formerly to hunt, as for a needle in a load of hay, through various books mainly dealing with other matters. Often, indeed, the seekers would be left in doubt as to whether their find would turn out to be a needle or a bodkin. Mr. Ward travels over the ground indicated by the Department's syllabus, explaining concisely and pleasantly what is required, and why; not forgetting to show occasionally the wrong way as well as the right. The methods, forms, and laws of ornament, its varieties and classes, are carefully dealt with, and throughout very fully and effectively illustrated. An example of mnemonic ornament in English character should, however, be added to those in Egyptian and Japanese. There is a useful glossary appended, but it might be much fuller. Architectural terms, for instance, such as 'stopped mouldings,' 'linen panel,' &c., are not necessarily familiar to students of principles of ornament. A table of all the styles and periods mentioned in the book would be a useful addition.

Examination Papers for Pupil Teachers, 1st, 2nd, and 3rd Years. London: McDougall's Educational Co., Limited.

In these days of increasing attention to the thorough training of Pupil Teachers, a thorough acquaintance with what has been demanded in previous examinations is a *sine qud non* to success when the ordeal has to be gone through. For this reason the utility of such books as those now before us cannot be gainsaid. The arrangement of the questions is simple and clear, and the model working out of the last examination question leaves nothing to be desired.

Knowledge Through the Eye. London: Geo. Philip and Sons.

The growing recognition of the magic lantern as a piece of school apparatus will make this little book welcome to the teacher who would utilise this excellent aid to the full. Concise directions are given for the preparation of slides without the agency of the camera under the following heads:—(1) Preparation of the drawing, (2) Printing from the drawing, (3) Developing the plate (or negative), (4) Printing from the negative. To this are added three valuable appendices, I. and II. on the use of the Optical Lantern in Class Teaching by J. Dickinson and Marie J. Mason, III. on the Paget Prize Printing-out Lantern Plates. Altogether the book provides a bountiful shillingsworth of useful knowledge for the enterprising teacher.

The Church Catechism Explained. By the Rev. Arthur W. Robinson, M.A. Cambridge: at the University Press.

Those who may be engaged in preparing young people for the divinity section of the Local Examinations, or for Confirmation, will find this a very useful text-book. It thoroughly answers to its title, and is written with clearness and good sense. The introduction treats of the history of the Catechism, and three chapters are devoted to each of the five parts, into which it may be divided, namely, the General Teaching, the Creed, the Commandments, the Lord's Prayer, and the Sacraments. The whole is characterised by earnestness, moderation of tone, and considerable breadth of view, as may be understood, when we mention that in the course of his little work Mr. Robinson quotes from Shakespeare and Milton, Tennyson and Browning, Coleridge and Macaulay, Emerson and Carlyle, as well as from leading theologians, including Maurice, Lightfoot and Westcott. The book is produced in the neat and substantial style characteristic of the Cambridge University Press.

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